Bruno Lemaitre

An Essay on Science and Narcissism

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ISBN: 978-2-8399-1841-1
Manufactured in France by Copy Média

Cover image: Professor Maurice Carraz, head of the Immunology Department at the Institut Pasteur, Lyon, is seen here with his team in the 1960s. The powerful position of the professor, clearly visible in his black suit, is reinforced by his entourage composed of sixteen, predominantly female, collaborators in white coats. It is difficult to resist the temptation to project the social dominance relationships observed in primate society onto academic life. The cover is adapted from Figure 13. Bibliothèque Municipale de Lyon, Fonds Georges Vermard (1968).

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To Nouhad, Joseph, Céline, Eugène and Olivier

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Acknowledgements

I would like to begin by thanking my wife Nouhad and my children Joseph, Céline, Eugène and Olivier for their continuous support and warmth at home; sorry for being self-absorbed with this book project and this new passion for personality.

This book would not have been possible without the help of many colleagues and friends. I would particularly like to acknowledge Marie Meister who has helped me throughout my entire career and who takes all my projects seriously. More than 15 years ago, she gave me a book *Comprendre et gérer les caractères difficiles*. This was the start of a new passion.

I am indebted to Leonid Schneider for his many insights on the influence of narcissism in science and also for his important help in the writing of this manuscript. I would also like to thank Jeremy Garwood for initial corrections on the first draft and for pointing me towards important literature. Thank you to Jean Gayon, Thomas Pradeu, Michel Morange, Keith Campbell, Walter Gulick, Nicholas Holtzman, Peter Lawrence, Harvey Schoolman, Gonzague Lemaitre, Ranjiv Khush, François Karch, Yash Hiromi and Gregory Feist for insights on specific questions. I am very grateful to the Réseau Blaise Pascal for sending me information on Michael Polanyi four years ago; the reading of Polanyi books has changed the way I think about science. I would like to thank Antoine Albertelli for helpful discussion and research.

I am grateful to Virginie Orgogozo for her feedback on the manuscript. This essay is the fruit of much debate with scientists in

life sciences, notably female colleagues. The list would be too long to enumerate, but many of these people are close to my heart.

As I am not an expert on either social personality or evolutionary psychology, I apologize to any authors whose work I have not referenced and whose ideas I may have distorted. I would be most happy to receive feedback and criticism. I would like to thank David Buss, Keith Campbell, Jean Twenge, Robert Horton, Gregory Feist, Thomas Söderqvist and their editors for authorization to quote certain passages.

I am grateful to Céline and Joseph Lemaitre, Stéphane Catrysse, Laeticia Carrette and the production staff of Copy Média on the task of publishing this book. A special thanks goes to Jo Garden for editing this book with great professionalism.

And finally, I am especially grateful to the communal sense of Swiss people, and to the good organization of Swiss universities and their administrative assistants, including my secretary Veronique Dijkstra-Bulliard, for saving so much of my time.

Introduction

Motivation to become a scientist often starts by reading a textbook, attending the course of a charismatic professor in college or by watching a television documentary. For me, learning about the mechanisms underlying the nuptial parade of birds, the organization of the universe and the evolution of life has always afforded moments of delight and great satisfaction. The need to understand our surrounding environment and the hope of grasping long-lasting truths in our unstable world makes science very appealing. Yet science would not be so attractive without the heroic scientific figures that actually contributed to it through their discoveries. Reading scientists' biographies, we learn that they had to face multiple difficulties before convincing others of their ideas and that they were inexhaustible in their effort and exuberant in their creativity. Legendary scientists provide attractive role models to emulate. Childhood is the time of grandiose dreams and great expectations, and science can offer a fabulous path to glory and recognition.

For a long time, scientists were presented as individual heroes working alone – Galileo fighting the obscurantism of religion, Louis Pasteur as a benefactor of humankind and Albert Einstein, magically producing a new aspect of reality out of thin air. These heroic images of scientists penetrate the minds of children in remote places, villages and towns, but are relatively removed from actual laboratory life and from where science is really carried out. The modern history of science has now revealed that this idealization of the scientist is in fact rather a kind of subconscious marketing to promote the development

of science (Fara, 2009). After all, for a long time, the position of scientific enterprise in society was not fully secure, and the emphasis on singular geniuses contributed to its promotion, akin to the role of saints in the expansion of religion.

While reading biographies of these heroes, though, sometimes we can glean information that reveals their small-mindedness or their strange fantasies – cracks in these larger-than-life monuments. Some of them, for example, had a propensity to self-appropriate the discoveries of others or to misuse public resources thanks to their connection to politicians. Many of them proved to be miserable parents and partners, with their personal life built on opportunism. A number of these geniuses were extremely dogmatic and condescending towards the work of others. The history of science is also full of intellectual rivalries between different schools of thought, which often masked personal quarrels and deep hatred. In his posthumous praise of his rival Jean-Baptiste Lamarck, Georges Cuvier, the famous 'father of palaeontology', noted in the most delicate terms that to be a genius is an unusual thing and that sometimes a lot can even be learnt from mediocre scientists, as exemplified by his colleague Lamarck (Cuvier, 1836). The scientific contribution of Lamarck, one of the first to elaborate an evolutionary vision of life, was depreciated for many years. The history of science is thus full of incredibly base rivalry between individuals.

In his book *The Double Helix* on the discovery of DNA in the 1950s, James Watson went further. He openly admitted his will to succeed and get ahead (Watson, 1968). He also told us that he found his colleague Francis Crick arrogant, with a high ego. This frank text was somewhat shocking at the time, revealing that scientists were not monk-like beings only devoted to science, but that they also had, like everybody else, a human personality. More often than not, this personality is described as being *strong* or *difficult*. And in a scientific context, a *strong* or a *difficult* personality usually politely implies a narcissistic personality. When, as young students, we enter a science

laboratory, we progressively discover how research is really carried out, soon witnessing rivalries, fights for power, strategic occupation of the media scene and elitism in institutes and universities. Scientists are not always driven solely by a pure desire for truth, but rather, to use the term in its psychological sense, by a strong need to dominate and gain the recognition they consider to be their due and by a desire to flaunt their successes in front of their colleagues. Young scientists quickly discover that many of the greatest figures in their field have Janus' double face. Strong disappointment can arise once these young scientists realize that many of the legendary figures that attracted them when they were young, perhaps because of their mythic life or their writing skills and who made them dream of another life far from their unfair and competitive surroundings, often turn out to be cold, ill-tempered and narrow-minded.

This essay will explore the link between narcissism and science, with a focus on life sciences. The observation that many truly great figures of science were also very narcissistic indicates that this is a delicate subject, with many grey zones. Nevertheless, the prevalence of this personality type in science and the current crisis of values affecting it (and society in general), make this subject timely.

In any case for me, this is also another way of continuing the exploration of the universe that began in my childhood. This time, though, it is about closing the loop by 'analysing the analyser' – ourselves or the individual scientist whom we thought objective and accurate, but who is also biased by his own personality. If successful, this essay could be a path to liberation for some, for those still in the science world and for those who have left science disappointed or humiliated. As human personalities have been the focus of fascinating studies by psychologists for quite some time, these studies can shed light on the scientific enterprise.

Narcissism is one of many human personalities. In this respect, an individual's character or personality may be considered a configuration of traits that persist over his or her lifetime and that can be

observed in different contexts (Carver and Scheier, 2012; Larsen and Buss, 2005). We can say of a friend that she tends to exaggerate her own achievements or that she takes criticism very personally. This is part of her personality, because it is observed on multiple occasions and not only under stressful conditions. A second feature of personalities is that they influence our choices, our behaviour and our vision of the world.

The analysis of character traits in humans is complicated by the fact that they cannot be defined in a simple manner, because each individual expresses them in his or her own way. The identification of a character is based more on a feeling than on objective knowledge. This is why this essay is delicate, as science is naively considered an objective activity, free from the influence of scientific personalities. What is often forgotten, however, is that scientists are indeed human, with all their strengths, weaknesses and irrationalities. Eventually, their personalities strongly influence the direction and outcomes of science's supposedly unbiased progress. While personality types are complex, and mixed and influenced by the surrounding cultural environment, with a little experience it is nevertheless possible to identify general categories. A laboratory microenvironment that hosts people from all over the world and from various social and cultural backgrounds actually provides an optimal terrain for analysing human interactions and the influence of personalities on teamwork. This probably explains why the question of personalities is often a topic of discussion among scientists at meetings once the scientific sessions close, leaving time for informal interactions.

A strong character is not necessarily pathological and can even be positive in certain conditions. A very high-level of self-confidence that may, at first sight, look like rigidity under normal conditions can prove extremely beneficial when under stressful and competitive conditions. People with a strong or difficult character often have conflicting social relationships, from which they can suffer, too (Lelord and André, 2000). To take this a step further, our person-

alities strongly influence the relationships we have with one another, and despite the use of a common, articulate language we can still experience an inherent lack of understanding. This underlines the importance of tacit knowledge and communication, a notion that I will refer to throughout the essay. Not only are tacit interactions much broader than just verbal and explicit communication, they actually sustain explicit knowledge. As a concrete example, when you watch a presentation, you can shift your focus from the delivered message to the speaker's body language and attitude towards the audience. Studies have shown that appropriate body communication and attitudes are as important as the actual message that is conveyed and furthermore are an indispensable prerequisite for transmitting information to an audience.

The philosopher Michael Polanyi has underlined how science, far from being truly objective, is influenced by the human nature of the knower. He also showed that a large part of scientific activity is tacit, involving non-articulate judgments that are sustained by biological capacities shared with higher animals (Mitchell, 2006; Polanyi, 1962a, 1966). As an example of the power of tacit knowing, the sociologist Harry Collins has shown that even without knowing its basic concept, we can master the language of a scientific field quite well, simply through impregnation and by spending time with scientists, just as a child learns a language (Collins, 2014).

I will follow Polanyi's ideas but go further by analysing the influence of personality traits on the scientific world. The central idea in this essay is that narcissism is an advantageous trait for succeeding in science. Scientists with a high ego are better able to convince others of the importance of their research. This establishes a tacit relationship between the notion of the 'self-importance of the scientist' and the apparent 'objective importance of their research'. Scientists who have narcissistic traits possess additional advantages in science because although appearing objective and honest, they are networkers and thus well positioned to exploit the different facets of the research

system. This is why many of them ultimately occupy leadership positions within research institutions.

Throughout the text, I will sometimes refer to the narcissistic personality as a 'phenotype', without distinguishing its genetic or environmental origins. This is to underline the fact that narcissism is not an assumed strategy but rather an underlying psychological setting that delineates a person. Consequently, narcissists will sometimes be described as if they were following a certain 'strategy' but this does not imply that it is a conscious decision or the explicit representation of a goal. This is a very important point to understand.

The first part of this essay will illustrate facets of narcissism in the context of life sciences with real and fictional examples. Once we are familiarized with narcissism, the second part will analyse the links between the narcissistic character and science. In particular, I will explore how cardinal features of the narcissistic character, such as self-enhancement and inflated self, surreptitiously influence scientific practice. The third part will present recent theories from both social personality and evolutionary points of view on the origin of narcissism. Furthermore, I will summarize a number of theories related to the narcissistic character in an attempt to establish a fruitful connection between the philosophy of Michael Polanyi regarding tacit knowledge, evolutionary psychology and social-personality literature. The fourth and last aspect of the essay will investigate a recorded recent increase in narcissism in Western society and how this change has not only destabilized our society in general but also scientific practice in particular. An increase in narcissism could explain many of the trends that have been observed in recent years in life sciences, such as an obsession with ranking researchers and their research, a lack of curiosity in the work of noncompetitive colleagues, increasing inequalities in funding, a rise in misconduct and an excessive emphasis on scientific marketing and networking. This increase in narcissism could be damaging for science in the long term, since it affects both its image in society and its attractiveness to

new recruits. Propositions for another system of values, which could possibly counteract some aspects of the rise of narcissism, will then be discussed. I will close the essay with my personal thoughts on the general rise of narcissism in our society and on Polanyi's message, still topical today, on the importance of recognizing our values.

As the views and ideas discussed in this book are considerably referenced to my own personality, they should not be seen as an attempt at objective truth but rather as a discussion of personal views and opinions. My main motivation for writing this essay was to try to understand behaviours and attitudes that have repeatedly struck me during my scientific career. I have come to realize that works by other scientists in the fields of social personality and evolutionary psychology have provided me with the best insights for understanding my surrounding world. Through my narrow focus as a molecular biologist, I have processed knowledge from these two fields and integrated them into this essay. Books and articles that are the source of many ideas discussed in this essay are presented in the reference section.

Important notes

This essay is not a rigorous psychological analysis using quantitative tools but rather a personal view of the scientific community, seen from the inside. As this essay is focused on something that is not easy to quantify objectively, it evidently has a subjective aspect that is based upon my personal observations and discussions with colleagues. The focus will be mostly on narcissistic male scientists because the trait is usually more pronounced in human males than in females. Thus, this essay will largely deal with male narcissistic scientists (those currently occupying many of the key positions in academia) with female scientists present as part of the surrounding scenery. Of course, women can also be affected by this trait, notably many of our scientific stars with their high media exposure, and although this will

not be its focus, this essay may nevertheless help to show why, despite multiple positive measures, promoting women in science is difficult. The world of science has been oriented for, and by, narcissistic persons and has always pushed aside people who have a greater sense of community.

As characters vary among human populations and cultures, some of these ideas may not apply equally to non-Westernized cultures. Nevertheless, narcissism and its possible rise have a global impact due to the fact that the standards of science and of an advanced society in general are largely set in Western countries.

In this essay, the term 'narcissism', which is used in social-personality literature, has been favoured. Scientists at meetings also sometimes use the terms 'alpha male' or 'high-ego person' to designate a person with this type of character. Narcissism is a trait for which there is no qualitative cut-off point. In the following text, the expression 'narcissistic scientists' refers mostly to scientists with big egos but never to extreme narcissists. Thus, we will analyse scientists who rate high on the narcissism scale but who do not necessarily reach the threshold at which this would be considered a pathology. Throughout the essay I will navigate between descriptions of strong forms of narcissism to illustrate my assumptions and the more subtle ones usually observed in the scientific environment.

A final important point to make clear is that I have nothing against narcissistic people. Firstly, because I might share many of these narcissistic traits and, secondly, because I would lose some of my friends. I even believe that a certain dose of narcissism can be positive, provided it is constrained by a framework of human values (see Final remarks). This essay rather seeks to reveal the more counterproductive aspects of this character type, the consequences that its domination has had in science, and how the presence of many narcissistic people in top positions has served to define it.

This essay is by nature reductionist. A character trait can condition important facets of a human person, but it does not prescribe the

entirety. Thus, there will be exaggeration and simplification in the following text. In no way would I advocate a black and white scenario with narcissism depicted as being wholly bad. A good society is a society that accommodates diverse types of personality. Nevertheless, the increase of narcissism in science, and in our society as a whole, together with a loss of human value is a potential danger for our future, as it leads to a never-ending race for power, wealth and beauty. A better understanding of this type of character could help us to find countermeasures, and science could be one of the first fields of investigation to fight against the rise of inequalities that could be seen to have emerged as a direct consequence of the rise in narcissism. This is one of the goals of this essay.

Part I

An Introduction to the Narcissistic Personality in the Scientific Context

Chapter 1

An Introduction to Laboratory Life

Before starting, and for those who are not directly connected to the world of life sciences, a short introduction to laboratory life might be useful; this chapter may also be useful to young biologists at the beginning of their career.

Scientists working in life sciences form quite a diverse group of individuals, with different motivations behind their research. Some (not as common these days) began life as a naturalist-type child that collected stones and insects, where research is a way for them to continue their childhood passion. Darwin could be seen as an emblematic figure of the naturalist. Others have the medical phenotype, with the hope of using scientific knowledge to save the world by treating disease in order to improve the human condition. A Louis Pasteur-figure as the saviour of humanity is appealing for them. Another group are drawn to science as a way of combatting obscurantism and naive beliefs with the aim of forging a world based on rationality. Here, the figure of a Bertrand Russell could be their model. Many others simply continue their studies with a more or less marked interest, year after year, one day ending up in a laboratory. Whatever the paths to science, real life in a laboratory is usually very different from what a young scientist might have imagined and from

what the lay public think; although in recent years there have been efforts to present a more realistic view of science.

A scientist's life can be seen a succession of steps: a PhD thesis of three to six years that culminates in the title of Doctor, a post-doctoral period of some years consisting of from one to three experiences in various laboratories, and then for a few of them, a position as an assistant professor that might later be assured by a permanent position. Professors usually develop their scientific profile as the prolongation of their past research experience, building on their work as PhD students and postdocs. In a laboratory, PhD students and postdocs usually do most of the experiments, sometimes helped by skilled technicians. Their job tasks, at least in universities, often involve a significant share of student teaching on behalf of their professors. Professors are usually less inclined to abide by their institutional duties of lecturing and tutoring, because they see research as the most rewarding task, one that could lead to influential leadership in the field. Leadership can be established by articles published in high-profile journals, invitation to conferences and seminars, successes at obtaining grants, and sometimes prizes. As their laboratory grows, professors tend to be transformed into a kind of manager, quite remote from the workbench. Their academic activities consist of discussing research with their students and postdocs, travelling to meetings, visiting institutes, writing scientific articles and grant proposals, networking and communicating with colleagues and journal editors and peer reviewing the science of others, complemented by attending to administrative tasks in the faculty. While the orientation of laboratory research is usually defined by its principal investigator or professor, all lab members, technicians, PhD students, postdocs and junior investigators participate in research design and provide their own ideas. Many projects are performed as complex collaborations among members of a lab, as well as between different research groups, sometimes located on the other side of the world. This collaborative endeavour is more or less reflected by the often very

long list of authors of a publication. In the field of life sciences, the first authors in the publication list are the main contributors by order of implication and the last one is the professor. Additional symbols next to the authors' names stating equal authorship or who is most responsible by being credited as the corresponding author indicate how difficult it is to attribute credit in science. Nevertheless, the true driving force behind any project is usually one to three individuals working in an optimal environment.

Success in science is usually achieved by publishing 'seminal' articles, and generally it is assumed that good articles end up in high-profile journals such as *Nature*, *Science* or *Cell*. Thus, a very simplified view of today's science could be to describe it as an activity of publishing papers in top journals. Without question, science is about much more than that, yet it is important to understand the way in which experimental data is transformed into articles, because publishing is the main route to any scientist's career advancement.

When data are judged to be sufficient, they are combined in a narrative text with figures, methods and references to other articles, and sent to the journal editor. The style of the article and the way the story is presented rarely reveal the true experimental progress or the whole scientific background of the discovery. The key point is to highlight how the findings are important and novel – in one word, to convincingly sell them. This salesmanship is an integral part of the scientific process, and yet is largely unknown to the general public. This business vocabulary is appropriate, as a great deal of what goes on in the scientific world concerns money – mostly funding, without which very little research would be possible. A typical process for securing funding could be as follows: the scientist first has to sell the idea of a future project to a funding agency in order to receive initial funding and begin his research. He then writes up the obtained results in the best possible way to sell them to journal editors and peer reviewers. Finally the published papers, especially those published in highly ranked journals, provides

justification for additional financial support from the grant agency in order to continue the research. An unrelated, but not inconsequential financial aspect is that of career promotion, which again depends on selling one's own achievements and publications to academic and industrial appointment committees.

The publication of a paper is the most important element of the scientist's sales pitch. A submitted manuscript is first reviewed by the journal editor, who then sends it to external experts. These experts, called peer reviewers, provide a list of comments to the editor. Based on these comments and his personal judgment, the editor makes his decision: the paper can be rejected, sent back for major revision or accepted. This reviewing process is done with little transparency, anonymously, and depends on the judgment of peers and editors who are considered fair and honest. Waiting for reviewer feedback is often a moment of intense pressure, especially in a competitive field where the concurrent publication of a paper can scoop one's own work and thus rob it of its precious novelty. Submitting a grant proposal to obtain research money obeys the same logic of external reviewing. A grant proposal is a narrative text that justifies the importance of a certain field, which, despite many advances and important contributions by the author, needs additional research. As funding and space in top journals are limited, the scientific world is very competitive, not only between individuals but also between fields of research.

A fundamental feature of the scientific enterprise is its hyperspecialization. Titles of papers and seminars can appear strange and very specific to outsiders. As students read papers, discuss them at weekly laboratory meetings and listen to seminars in their institute and at congress, they learn the standards of their field more by impregnation than in a rational way – 'tacitly' to use the Polanyian terminology. Unconsciously, they are learning the methods and their caveats, the milestones of the field and what the most important challenges are. Within their field of research, scientists usually gauge their progress

by their accumulation of articles. Abruptly or subtly, the standards of science change, highlighting other ways of looking at a particular question, at which point the scientific community jumps to conquer this new area. Sometimes, a field is declared dead and research attention dries up. This never happens because all the questions have been solved, but because people become bored. Eventually, a perception manifests itself that there are no longer any breakthrough discoveries to be made in this field. The short life expectancy of certain research fields and fashion trends that push many competing scientists to work on a few 'hot' areas is a striking feature of science today. Sometimes, an abandoned or 'dead' field may be revived due to a change in fashion, and the scientists working in this field (previously viewed as second-rank) obtain the status of pioneers.

One of the most striking aspects of science is the degree of passion. At meetings, presentations look like shows where scientists use all sorts of seductive strategies to convince the audience of the importance of their findings. The key point is to capture the attention of a distracted public saturated by information and to reveal the importance of the discovery. This point illustrates the fact that science is far from being objective knowledge rationally discussed and interpreted by scientists, but instead a mix of individual beliefs and opinions that compete with one another. This passionate competition can lead to scientists becoming obsessed with proving their views on specific questions in their field of research. Yet as soon as they change the field or leave science, they rapidly forget the passions once so important to them.

Despite the erroneous public perception of a successful scientist as a lone genius or an independent maverick, in fact, every one of them is always and without exception an inseparable part of his or her community of active scientists. The most proximal community is the small group of individuals truly capable of understanding the research, who are working on similar topics and who use the same techniques – they are the experts, often either collaborators or

competitors. A wider circle includes colleagues working on related fields, that read the same papers and that can mutually influence each other. Beyond this are additional layers including broader disciplines, industry, clinicians and engineers, and even the media and lay public.

Scientists are usually good at evaluating their close colleagues, but communication outside one's own area of expertise and between groups is complicated. Scientists often have difficulties communicating with the lay public, as comprehensive background knowledge and specific terminology are required to understand certain complex scientific concepts. As Polanyi put it, science is mostly an affair of tradition and community, and scientific knowledge in a broad sense is not just articles or textbooks, but scientific expertise carried out by individuals. This explains why science in a new institute does not emerge from nowhere by individuals reading previous studies, but from scientists coming from well-established laboratories who bring with them the art of doing science.

Scientists, especially biologists, are usually materialists – they see their molecules and genes as real objects. They are certain of what they do; in one word, they are objectivists, believing that science offers a direct and neutral view of reality. The link to reality is a vast question in epistemology and science sociology, with some claiming that science is just a way to manipulate the relationship between objects. Others such as Polanyi (and this is my point of view) believe that science is one way of entering into contact with the reality of nature, but that the human nature of the knower should be taken into consideration.

The importance of tacit knowledge explains why scientists need to meet and interact with each other. Scientific meetings provide a key role in the informal exchange of scientific information that is essential for carrying out research but that is not described in publications or textbooks. Once the scientific sessions are over and scientists gather among themselves informally, they often exchange information that is usually airbrushed out of their own research articles but that can

be critical to running a successful research programme. They discuss trends in the field, the value of published articles and how they have been pitched and sold. They discuss other scientists, generally focusing on the most influential ones. A large part of the discussion consists of evaluating the reputation of their colleagues. Some are qualified as opportunists, pushy, political, belonging to a mafia, or actually being quite nice and having real insight into a given field. Grumbling about bureaucracy, the burden of teaching, the poor level of students and the personalities of dominant members of the communities are all a part of these discussions. These moments of conversation are often joyful times that can end late at night and sometimes address more existential questions on life or science.

So it is that there is a wide ocean separating the science in student textbooks, presented as a series of breakthroughs and accompanied by tales of legendary great savants, from the reality of laboratory research as it is lived by scientists on a day-to-day basis. More than that, it would be extremely difficult to explain the dynamics and the size of a scientific field without taking into consideration the individuals who carry out the research and their personalities. It is in this context that our essay will explore how narcissistic personality traits have such a profound influence on multiple aspects of research activity, from selling science to the organization of the scientific community.

Chapter 2

An Introduction to Narcissism

Before analysing how narcissism affects science, I need to provide a definition of this personality type. This is a real challenge when we consider the complexity and diversity of human beings. Cultural variations and contextual situations strongly influence the expression of character traits. By no means do I seek to pigeonhole highly complex human individuals into defined personality types. Narcissistic tendencies are only one aspect of any individual's personality, yet it is probably the one most relevant for successful career progression in science. The goal of this chapter is to provide a first insight into the narcissistic personality as described in social-personality literature.

The narcissistic personality has been the focus of many studies over the past few years for several reasons. As will become apparent throughout this essay, one of the reasons is that these traits could represent an important dimension of human personality, influencing our socialization. Another reason for the interest in narcissism is that it has been associated with bad leadership and risk-taking decisions. For instance, many protagonists of the 2008 financial crisis were described as narcissists. Some commentators actually attribute the financial crash to the high levels of narcissism that prevailed in top financial institutions. Social-personality literature points to the brilliant career of Jeffrey Skilling, former CEO of Enron Corporation (now resident of the Englewood Federal Correctional Institution), who, when asked to assess his intellect during a Harvard

Business School admission interview, answered without hesitation, 'I'm fucking smart' (Foster and Brennan, 2011). Another aspect that will be discussed later is the perceived increasing prevalence of this personality type in Western countries.

Typological definitions of narcissism

Because psychologists have been studying narcissism since the early 1900s, it has been defined in a number of ways (Levy et al., 2011). Today's understanding of narcissism draws on intuition, clinical observation and empirical research in social and personality psychology (Campbell and Foster, 1997).

The cardinal feature of the narcissistic personality is a strong sense of self-importance and a need to be admired. Narcissists see themselves in a very positive light, aggrandising their accomplishments while minimising the work of others. They have dreams of greatness, and expect adoration from others. They feel entitled, expecting specific treatment from others, without necessarily doing anything to earn that special treatment. Narcissists are not empathetic, lacking insight into the feelings of other. Instead, they use their relationships to promote their own interests. They feel that they are special and superior and as a consequence, seek association with others whom they consider to be similarly unique or gifted. Thus, a large part of the narcissistic personality can be viewed as deriving from the mental construct *I am special*. *I am special* implies that *I deserve special treatment from others* or that *I need to associate with other people that are also special*.

A more sophisticated construct of narcissism is the Campbell's agency model (Foster and Brennan, 2011). According to this model, narcissism is conceptualized as a self-regulating system comprised of four mutually reinforcing elements:

- an emphasis on agentic (to stand out from the community) over communal concerns (to integrate socially);
- approach orientation (being more strongly motivated by reward than punishments);
- an entitled and inflated view of self;
- a general desire for self-esteem.

This narcissistic core reinforces a variety of interpersonal skills (confidence, charm) and the use of interpersonal strategies (e.g., fame seeking, self-serving bias, relationships with trophy romantic partners). All the elements are connected to each other via positive feedback loops and have the potential to be mutually reinforcing.

The first point indicates that narcissists place more value on getting ahead than getting along socially. They tend to score high on traits associated with agency (e.g., extroversion, action, competence and power) and low on traits associated with communion (e.g., agreeableness, warmth, kindness and affection). This goes towards explaining why narcissists have been shown to view their close relationships as self-enhancement mechanisms rather than partnerships. It also shows why narcissists seek to form relationships with partners who can meet their increasingly prominent agentic demands.

The second point is that narcissists are attracted by success and fame, and are less sensitive than others to negative social implications, such as cost to the community. We will see in Chapter 8 that this explains why they sometimes take excessive risks. The third point underlines the fact that narcissists feel that they are *special* and *entitled* to certain privileges. The 'inflated self' underlines the propensity of individuals high in narcissism to overvalue their own achievements while subtly depreciating the contribution of others (see Figure 1). The self-serving bias is a natural aptitude to take credit for the success of others but to blame others for failure. It participates in the dynamic of many narcissistic leaders. The fact that they

aggrandize their accomplishments allows them to initially impress naive individuals that do not know them very well. They often distort reality in their favour by self-appropriating the achievements of others or by externalizing their own failures. It is important to realize that the overevaluation of their accomplishment is not a strategy but a consequence of personality bias. The fourth and last point underlines that narcissists are extremely attached to a positive view of themselves. This explains why they can overreact to simple criticism and strive for relationships or situations that provide them with reverence and admiration.

The main interest of Campbell's agency model described above is that it highlights the importance of the self-enhancement feedback strategies that characterize narcissism; these self-enhancement strategies will be outlined in Box 1. It also shows that narcissism is positively correlated with self-esteem, which has positive consequences. For example, grandiose narcissists tend to be extroverted and less socially anxious. It is important to take into consideration that narcissism is not a clearly defined entity, such that the narcissist can be distinguished from the non-narcissist. When social-personality experts talk about the proverbial narcissist they are using shorthand to refer to people who report possessing a large number of the narcissistic attributes described above (Foster and Campbell, 2007; Holtzman and Donnellan, 2015).

Although this is the topic of intense discussion, current research literature points to the existence of two primary forms of narcissism: grandiose narcissism and vulnerable narcissism. The grandiose narcissist is extroverted, over-confident, high in self-esteem, attention seeking, dominant, interpersonally skilled and charming, but also unwilling to take criticism, aggressive, high in psychological entitlement and interpersonally exploitative (Miller et al., 2013; Pincus and Roche, 2011). Like the grandiose narcissists, vulnerable narcissists are filled with grandiose dreams of specialness and entitlement in love and success, but at the same time, they also feel intense shame

Figure 1: The grandiose narcissist: Karajan

This photo shows Herbert von Karajan on stage – the classic figure of the maestro conducting his orchestra that many professors envy. We can expect personalities who are high in narcissism to better fit the job of conductor, not only through their skills as a conductor but also by their capacity to fascinate others. In an article for the *Sydney Morning Herald* in September 2014, classical music journalist Barney Zwartz describes Karajan: 'He exemplified glamour and power, even flying his own planes, but he became increasingly narcissistic, obsessed with his image. He personally oversaw the recordings and the videos that spotlighted his aristocratic face and immaculate leonine mane of white hair, eyes closed to suggest spiritual connection. Another joke had it that Mozart was born in Salzburg, the birthplace of von Karajan (Zwartz, 2014).' The point is not to state that all orchestra conductors are narcissistic, but that certain type of jobs with a strong social exposure will tend to attract individuals in search of admiration. Credit: © Corbis

regarding their needs and ambitions. Thus, the dominant effect is shame rather than envy or aggression. Because of this antagonistic interaction between their high expectations in life and their shame, vulnerable narcissists have difficult interpersonal relationships and are sensitive to the opinion of others, being easily hurt or embarrassed. They can show paranoid trends such as thinking the world is unfairly stacked against them. While grandiose narcissism includes traits such as grandiosity, aggression and dominance, vulnerable narcissism is thought to reflect a defensive and insecure grandiosity that masks feelings of inadequacy and incompetence (Miller et al., 2013). Thus, narcissism is paradoxically accompanied by a stronger dependence on the respect and attention of others. In grandiose narcissism dependence, the self dominates the others who are needed to provide admiration. In vulnerable narcissism dependence, the others dominate the self. Most of this essay will focus on the grandiose form of narcissism, although I believe that a healthy form of vulnerable narcissism is also highly present among scientists.

Box 1: Illustration of feedback mechanisms

Narcissists are not particularly concerned with social approval, but instead enjoy tasks that involve interpersonal competition and outperforming others. An important point worth exploring is the notion of a feedback mechanism. Indeed, one of the key characteristics of the narcissistic dynamic is the need to constantly receive affirmation of the grandiose self (e.g., admiration) and to proceed to uncover the conditions under which it occurs (Morf and Rhodewalt, 2001). This is what personality experts mean when they write that there are narcissistic strategies for maintaining inflated self-views. An insightful example of feedback mechanisms in the business world is given by Campbell and collaborators (2011):

> John thinks he is special and talented, so he seeks fame and attention in his local business community. He is successful and this feels good. He becomes more confident and socially prominent. He then leaves his current spouse and marries a younger and more attractive wife (his related lack of empathy for his significant others makes this relatively easy to do). When

> he attends business functions with his trophy spouse, he feels a sense of power and excitement. This status is apparent to others in the business community who both admire and want to associate with him. John also feels entitled to a special life consistent with his status. To this end, he begins to embezzle money from his company and has a series of romantic affairs. When confronted by his spouse about this, he tries manipulation and charm. When that doesn't work he becomes angry and abusive. This dynamic, of course, can continue to feedback in a variety of ways (Campbell et al., 2011; Foster and Brennan, 2011).

An example of feedback mechanisms in a scientific context could be the following:

> John has just been recruited to a tenure-track position. He shows great dedication, asking key questions at each seminar, and is involved in multiple committees at his university. Everybody praises his dynamism. Meanwhile, he is successful in securing funding and organizes a meeting in a splendid location with many prominent leaders from his field. He also invites editors, suggesting that the field is moving fast and is a critical one. He publishes two papers in very competitive and prominent journals. John has now obtained tenure thanks to his papers and enters into intense networking with a higher circle of acquaintances. But he now seems to be much less interested in the local business at his university, instead having become a frequent traveller, well connected to similar types of people all over the world. His attention to communal tasks decreases – he does not even have time to read his students' work. The story continues in a similar vein (higher ranked universities and academies) until he receives the Nobel Prize, at which point he then appears on television as a modest scientist with a highly developed sense of ethics, discussing the difficulties of publishing or of being a PhD student, the problems with editors, and so on.

Another classic self-enhancement strategy is for a narcissistic scientist to place his most loyal lab members in key positions at his own university to better exploit common resources, and in other universities to dominate the field through a network. As we will see later, this establishes a 'reciprocal alliance' similar to that observed in dominance hierarchy in primates.

An interesting point is to analyse how narcissists behave when they are confronted with their own mistakes. They can externalize a personal failure by, for instance, derogating the analyst or the method of analysis, or alternatively, by distorting and restructuring the past to soften the blow and make the issue less relevant (Morf and Rhodewalt, 2001). In any case, to openly admit or even to atone for a failure is hardly ever considered an option. Thus, narcissists are always striving for a positive view of themselves, either by engaging in positive feedback mechanisms described above or by over-reacting when their status is challenged.

A dimensional definition of narcissism

In contrast to the typological description of narcissism, social-personality researchers like to break down complex personality traits into various dimensions. The so-called Big Five personality traits are five broad dimensions of personality that are commonly used to describe human personality (Larsen and Buss, 2005). These factors are openness, conscientiousness, extroversion, agreeableness and anxiety (neuroticism). According to this classification, grandiose narcissists are characterized by high extroversion and low agreeableness. Individuals high in narcissism also tend to score low on consciousness, with the exception of a relatively high score for achievement striving. Vulnerable narcissism, on the other hand, is characterized by low agreeableness and high neuroticism. The term 'low agreeableness' could seem surprising, as narcissists often appear charming, but this charm tends to vanish in the long term. A more detailed factor analysis on grandiose narcissism reveals four dimensions: leadership/authority, superiority/arrogance, self-absorption/self-admiration and exploitativeness/entitlement. While the first three are linked to high self-esteem, experts in social personality associate the last dimension with a maladaptive or unhealthy form of narcissism. An important research tool used

to assess narcissistic traits is the Narcissistic Personality Inventory (Raskin and Terry, 1988). It is a self-reported 40-item forced choice measure, which contains items that reflect narcissism, such as *I think I am a special person* and items that reflect the opposite; *I am no better or no worse than most people*. In order to avoid representation bias, both statements in a single question are socially desirable. Since the Narcissistic Personality Inventory is relatively long, simpler and shorter tests have been created.

Social-personality literature describes narcissism as a normally distributed trait in the population, with no clear cut-off point for elevated narcissism. This denotes that there is no dichotomy between narcissist and non-narcissist, but rather that individuals gradually differ in this dimension. Psychiatric literature conceptualizes the pathological form of narcissism as the Narcissistic Personality Disorder (NPD) – a lasting and rigid character structure associated with grandiosity, a lack of empathy and a desire for admiration. The DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, 4th edition), a reference handbook for the classification of mental disorders, specifies nine symptoms of narcissism (see Box 2). To be diagnosed as having narcissistic personality disorder, an individual must have at least five of these. As a result, the point prevalence (or proportion of the population that has this condition at a certain point in time) is relatively low, while the number of people with narcissistic symptoms, but who don't cross the line into the clinical disorder, is much larger. Research in the personality field shows that, at least at the level of personality structure, the narcissism trait and narcissistic personality disorder are very similar (Campbell and Foster, 1997). A narcissist, especially one with narcissistic personality disorder, is in constant need of recognition, which can exhaust his or her entourage. Moreover, as narcissists are recorded as having a grandiose sense of self-importance, they are highly vulnerable to blows to their self-esteem and do not take criticism well. Some of them might even behave aggressively while trying to obtain respect. Patients suffering

from narcissistic personality disorder have been shown to be at risk of exhibiting violence and incivility.

As stated previously, this essay will focus on the form of narcissism that could be called 'high ego', rather than on the clinical personality disorder, but among scientists we still might come across individuals very high in the trait, one of them being the immunologist Niels Jerne (see Chapter 3).

Box 2: Narcissism: Traits and signs (derived from Wikipedia)

- The subjects have a grandiose sense of self-importance, overestimate their achievements and capacity, and expect to be recognized as superior;
- Are absorbed by fantasies of unlimited success, power, splendour, perfection or ideal love;
- Think they are special and unique and that they can only be understood in special elite institutions and by people of a superior nature;
- Show an excessive need to be admired;
- Think that everything is due to them, expect to benefit from specific treatment and that their desires will be immediately satisfied;
- Exploit others in interpersonal relationships, exploit others to reach their goals (lie, blackmail, verbal aggressivity);
- Use other people without considering the cost that this may represent to them;
- Lack of empathy: they are not disposed to recognise and share the feeling of others;
- Often envy others and believe that others envy them;
- Display arrogant and haughty behaviour.

A motive-based perspective on personalities

Another approach that provides an interesting insight into human behaviour, notably that of scientists, is the motive-based perspective (Carver and Scheier, 2012). The idea is that human behaviour is driven by a number of motives in order to satisfy fundamental needs, and that individuals differ in their needs. These differences in motives underlie differences in personality. Four needs (power, achievement, affiliation and intimacy) have been the focus of extensive research. The need for power is the motive to impact on and control the other, to have prestige and to feel strong. Individuals high in this dimension are interested in positions of authority. Being sensitive to the view of others, individuals high in need of power are usually better at 'mind-reading' and in their ability to influence others. Top-level politicians are usually high in this dimension, being able to mobilize others. The need for achievement is the desire to do things well and to be competent. Individuals high in this dimension engage in achievable tasks that result in feedback on their ability. They usually avoid politics, because in this area they have no control on the outcome of their actions. The need for affiliation is the motive to get along with others and to form friendly social bonds. While individuals with a high need for power will tend to use social relationships to attain positions of authority, individuals with a high affiliation need view social interaction not as a means but as an end. Finally, the need for intimacy is the motive to experience close and warm relationships such as deep friendship. Not unexpectedly, studies suggest that narcissism correlates strongly with the need for power and to a lesser extent with the need for achievement, but is negatively correlated with the need for intimacy (Emmons, 1989). The motive-based perspective offers insights into the academic environment, in particular into the distinction between motives for power and achievement. Someone high in the achievement dimension works well in groups and can engage in an activity even if there is no

chance for glory. Those driven by the motivation to dominate prefer a competitive atmosphere and are more interested in their own success.

A few more insights to complete the picture

Studies have shown that people high on the narcissism scale are prevalent in the world of celebrity and show business, in television reality shows, and in top leadership positions in business and politics – roles characterized by power and a high media exposure (Gentile, 2011). This is also probably the case in sport, art and science, driven by the fame associated with these activities.

As stated above, grandiose narcissism is characterized by a high level of self-confidence and a sense of specialness, combined with low empathy for others. Thus, narcissism is not just about high self-esteem. Someone with high self-esteem can use their self-confidence to take care of others, while narcissists will tend to use others for their own benefit (Twenge and Campbell, 2009). Although narcissism can be seen as a rigidity of character, the first trait that usually makes narcissists fascinating for others is their 'fluidity' in social relationships. While many of us are full of hesitation and filled with self-doubt when coming into contact with a person or group for the first time, narcissistic people seize the opportunity to dominate the scene, to feel at ease and to be charming. This fluidity is probably a consequence of their high degree of self-confidence, their strong dependence on the regard of others that then leads them to seek attention from others, and the fact that they don't need to take into consideration the interests of others or of the community. When a small group of people forms, narcissistic people tend to dominate the group. They are recognized as natural leaders for their inherent communicative skills and self-assurance (Campbell et al., 2011). Social personality studies also show that this leadership charisma tends to vanish in the long-term as other members of the group realize that their own interests are not being taken into consideration

by the narcissist (Paulhus, 1998). Narcissism thus has a strong link with short-term seduction. This explains the perpetual agitation surrounding narcissistic people, which ensures that they stay in the spotlight. Some studies suggest that narcissistic people tend to do better in emerging situations, especially when there is a race for glory or a strong media exposure, but that they are usually not better or are even worse in enduring situations (Campbell et al., 2011).

Another subtle point to understand is their 'lack of empathy', despite the observation that some scientists high in narcissism can be very charismatic, seemingly warm and social. This is due to the fact that their warmness and social skills are used as a self-enhancement strategy. Experts in social personality often use the expression 'feeding the ego' to describe narcissists' approach to relationships; if the relationship proves to be sufficient food, it works and if not, it doesn't. This explains why narcissists consider their social and romantic relationships to be interchangeable; one trophy lover can be exchanged for another, a trusting colleague easily betrayed in the search for a greater pay out (Twenge and Campbell, 2009, 213–14). What counts is that their ego is fed with a constant flow of admiration. Professionally, the mutual flow of benefit and admiration is all that counts in an alliance; other friends and colleagues are easily discarded when they have outlived their usefulness. This change is facilitated by their lack of empathy and indifference to the suffering of those who do not provide a benefit. We will see later how this operating mode of interaction, coupled with the capacity for recognising people with the same personality, leads de-facto to the establishment of a network or clique of scientists in a game of mutual enhancement.

Narcissism is also linked to inflated self. This is usually revealed by non-verbal communication clues that signal dominance (stature, expansion of personal space and a strategic use of the glance). They exaggerate their achievements and are skilled at making their life seem almost mythic. This inflated self explains the seduction they exercise around them, with their ability to make elaborate and self-

assured promises. This is not only the way that politicians win elections, but also (as we will see later) for scientists to receive funding or have their paper accepted in top journals. Once we get to know them better and understand the reality behind the façade, there is often disappointment in their broken promises. This is the consequence of high confidence and inflated self. When they are in situations of power and can get what they want, there is a feeling of oversize in their accomplishments: an impressive house; a limousine, complete with the institute's own driver; or even a lavish institute party they throw for the benefit of their grateful employees – all of this paid for by publicly funded money.

Social-personality studies show that narcissism peaks at adolescence and remains high in young adults, to decrease with age (Foster et al., 2003). Many normal teenage behaviours such as self-absorption, egotism and thin-skinned over-reaction to criticism illustrate several cardinal features of narcissism, because high narcissism is often normal at this stage. Teenagers also behave as if they were on a pedestal – quick to see problems in others and concerned with the injustice and suffering in the world, yet rarely bothered to offer a minimal commitment to a collective task. Alone in their room, they don't usually do much, but become much more dynamic when under the regard of friends, notably the opposite sex. Adolescence is also a period in life where humans adopt risky behaviours. Excessive risk-taking can be explained by the fact that they overestimate their capacity. This developmental profile fits with the personality of narcissist scientists who are usually extremely aggressive in the early phase of their career when they need to find their place, and who later in age suddenly become ethical, taking on the role of a generous patriarch reigning over his field. Results from the Narcissistic Personality Inventory indicate that men tend to be slightly more narcissistic than women (Foster et al., 2003).

Could narcissistic behaviour be the consequence of a situation of power?

One major and complex question in the field of social personality is whether the behaviour of an individual is due to a stable trait associated with a person (i.e., their personality) or rather a consequence of the context (i.e., the situation) (Larsen and Buss, 2005). Some studies suggest that situational power leads to narcissism-like behaviour, simply because people in power are continuously treated with deference. Power is usually defined as an individual's relative capacity to modify the states of other individuals by withholding resources or administrating punishments. Dacher Keltner and his colleagues have provided an interesting theory of power by analysing a number of symptoms associated with power (Anderson and Brion, 2014; Keltner et al., 2003). They observed that situations of power favour positive emotions such as an optimistic mood and an increased sensitivity to reward, but also a tendency to use others as a means to their own ends. Situations of power also increase automatic social cognition, and as such, high-power individuals are more prone to stereotype others. In this line, studies suggest that high-power individuals judge others less accurately than individuals in lower positions, because the latter continuously need to scrutinize the actions of others. Elevated power also increases the likelihood of approach-related behaviour such as entering the personal space of others or initiating physical contact. High-power men are less inhibited in their flirtation with women and have an increased likelihood of socially inappropriate behaviour (sexual harassment, discrimination).

Many of the traits described above are similar to narcissism, which, as we have seen before, correlates with extroversion, a social ability to use others and higher sensitivity to rewards. This raises the question whether the narcissistic behaviour of managers such as influential scientists reflects their situation of power rather than that of personality.

One would be tempted to speculate that it is the position of power that turns an 'unbiased' scientist into a narcissist. However, the situation of power does not only have a corruptive influence. Keltner and his colleagues suggest that communally oriented individuals can become more altruistic when they are in a situation of power, for instance, by taking advantage of their power to redress an injustice. In fact, there are many reasons to believe that narcissism is not just a consequence of the power phenomenon, because this personality can be observed in lower power individuals. In the laboratory, for instance, it is possible to observe a young PhD student or postdoc showing minimal communal inclinations and tending to appropriate others' results. It is nevertheless probable that an institutional position of power could either reinforce the already existing personality traits of narcissism or simply offer their carrier better opportunities to implement this narcissistic behaviour. Later in this essay, we will speculate that narcissism refers to the capacity to endorse a social dominance hierarchy. Each individual differs in this capacity but a situation of power provides the environment to express this aptitude.

The vulnerable narcissist

In the text above, only the grandiose form of narcissism has been discussed extensively, because this is the one with the most visible character – individuals that brag, are quick to enforce their rights and sometimes show aggressiveness. This type of character is associated with leadership, but also with unethical behaviour and misconduct. We mentioned earlier that social personality experts also define a vulnerable form of narcissism that is probably also prevalent in science, but which is a little more complex. The terminology underlines that these narcissists are vulnerable to criticism, which is always taken as a personal attack. A harmless remark can induce a sometimes-visible overreaction such as blushing and anger. It seems that vulnerable narcissists perpetually need to protect their fragile self-esteem either

by avoiding any possible confrontation or by excessive reactivity as a mode of self-defence.

Just a few words about how I perceive the non-pathological form of vulnerable narcissism in science. As examples of vulnerable narcissism are rarely described in the usual psychological textbooks, the following text is speculative and personal. It is also assumed that vulnerable narcissism is a continuous trait.

We have seen earlier that as with grandiose narcissists, vulnerable narcissists are filled with grandiose dreams, of specialness in love and success in science. But at the same time, they also feel intense shame regarding their needs and ambitions. Because of this antagonistic interaction between high life expectations and shame, vulnerable narcissists have difficult interpersonal relationships. They often swing between up and down moods: up when the present fits their grandiose expectation, down when they hit a small obstacle to their goal. The amplitude of this up and down mood change is augmented because of their inflated self. They can exhibit avoidant behaviours because of hypersensitivity to ego threats and self-enhancement failures. For instance, they can show an apparent indifference to prizes and awards, but in fact, if they are not recognized through these awards, they can feel hurt by injustice. With their false modesty and their complex way of entering into relationships with others, vulnerable narcissists can be more difficult to understand.

Let's illustrate the distinction between the grandiose and vulnerable forms of narcissism. Imagine there is a surprise party at the closing of a scientific meeting. All the young students and junior scientists, so quiet during the scientific sessions, are now animated and excited. A grandiose narcissist will either stay to the side at the bar or rapidly leave the room to return to his *sublime* and *special* life. If he does decide to join the dancing, he must either be a remarkably good dancer or he will, humorously or in a charismatic way, attract positive attention to himself. In contrast, the vulnerable narcissist will be split between envying the dancers enjoying themselves and

fear of being ridiculed by the young men and especially women around him. He will probably leave and stay in his hotel room by himself with his dreams of *specialness*. But should a charming female student persuade him to join in, he will probably clumsily dance, despite feeling awkward. He just needed someone to ask him to dance, thus confirming his popularity – and so that he didn't have to get down from his imagined pedestal by himself. The student who invited him to dance performed a good action, because now our vulnerable narcissist will have a memorable evening. Our characters exert strong constraints on us and can often make us do the opposite of what is good for us. There is nothing better than someone who understands our fears and helps us to overcome them. This example underlines that both forms of narcissism indicate a higher dependence on the regard of others for admiration (grandiose) or acceptance (vulnerable). This difference could be explained by a difference in self-esteem, which is almost always high in grandiose, but fragile in vulnerable narcissists.

Concluding remarks

This chapter investigates cardinal features of narcissism as described by experts in social personality, but it is far from exhausting the subject. Other facets of the narcissistic personality such as its influence on romantic relationships or its impact on business will become more apparent in the following parts of the essay. The fact remains, however, that it is difficult to identify a narcissistic personality without living in close proximity and for a certain amount of time with individuals that score highly on the narcissistic scale. This is especially true for narcissists that excel in short-term interactions, often appearing extremely charming, but later revealing the self-centred nature of their personality.

In this line, it is worth mentioning that many young individuals tend to see others' personalities as similar to their own. For instance,

they might think that everyone has a need for intimate relationships, which is not the case (and should not been seen as a problem). This is why a basic understanding of personalities becomes useful in interpersonal relationships and notably in science. We should not view different personality types as being bad or good, because behaviour is strongly influenced by the general framework of our society and our local interpersonal environment. A competitive and aggressive environment can encourage certain aspects of our personality, while the presence of generous individuals around us can have the opposite effect.

Chapter 3

Detecting Narcissism in Science with Real-Life Examples

As we read biographies of famous scientists, we quickly realize that many of them were quite egocentric. Newton, Einstein and Pasteur are examples of highly successful scientists that would probably have had a high score on the narcissistic scale. Their high ego is often revealed by small details in their attitude, a certain way of socializing or the strain they put on their close relationships. All of these hints are scattered throughout their biographical records and in the list of their accomplishments. After the initial phase of fascination, historians have now started to revisit many of these great figures and to place their contribution within its actual context (Fara, 2009). The objective of this chapter is not to provide a compelling analysis of selected scientific personalities but rather to give a face to the narcissistic personality. This can be especially useful for young and idealistic scientists who often move to science after being fascinated by these heroic figures, but who can eventually become disappointed with the reality they encounter.

This chapter will focus on the grandiose form of narcissism and illustrate facets of this personality using knowledge gained from social-personality literature. It will cover three historical examples of scientists with high egos, which will be completed by three fictional

characters in the following chapter, illustrating the many facets of narcissism in science, in the past and today.

Niels Jerne, the great seducer

Niels Jerne (1911–1994) was a charismatic Danish immunologist who was awarded the Nobel Prize in 1984. An interesting biography by science historian Thomas Söderqvist, *Science as Autobiography – The Troubled Life of Niels Jerne*, gives us an insight into Jerne's private and scientific life. This biography is based not only on written documents but also on a long series of interviews between Jerne and Söderqvist. Jerne did not want to accept a *normal* life but aimed for the *sublime*. He had gathered together all his personal papers in the secret hope that they would be kept for posterity. However, what he did not realize was that from these notes, his future biographer would be able to more accurately assess the success of this narcissist.

According to Jerne's biographer, Jerne was not a bench scientist, could not pipette accurately and did not enjoy experimental work. Thomas Söderqvist notes that 'Jerne later came to be considered very theoretical and "*extremely economical*" in his experimental planning; it is said that he thought intensively before going into the laboratory, after which he carried out "*one or two critical experiments*"' (196). For Jerne, bench work was an inferior activity for a scientist of his calibre. His Nobel Prize was awarded for theories, rather than discoveries, notably the natural selection theory of immunology. Niels Jerne told his contemporaries that he had discovered the immune theory of selection while he was crossing a bridge in the middle of the night in Copenhagen. But in his article, he neglected to mention that he was strongly influenced by previous work from another immunologist Paul Ehrlich, which of course he did not quote. He transformed his discovery into a special and mythic moment, without recognizing any filiation with other scientists.

As is often the case for narcissistic scientists, he liked keywords and

invented multiple innovative names such as epitope, paratope, idiotope, xenotope, pantachotope, cis- or trans-immunology (of which the word epitope is still in use). We will see later in this essay how the use of catchy keywords is often a way to increase recognition within the scientific community. Scientists high in narcissism are attracted by fields that use a *special* language full of jargon, as did immunology in the past, as this denotes that it is a conceptual field, whose main concepts can only be explained with difficulty to the lay public.

Interestingly, given narcissists' skill at networking, Jerne is also credited for a theory called the 'idiotypic network' that was taught for many years (Jerne, 1974). It describes a speculative framework in which antibodies self-recognize each other, establishing a network paralleling the nervous system. This theory lasted for one or two decades, but now has been discredited as simply speculation based on very few empirical observations. But it did attract a lot of fans – an entire book is devoted to this network theory (Hoffmann, 2008). A significant number of prominent immunologists based their careers on this theory. While it could be imagined that past errors might cause these immunologists to become modest, this is far from being the case. In more general terms, many scientists, some being highly arrogant and dismissing other fields as minor, have built their careers on incorrect theories or papers that are completely insignificant today. In science, incorrect statements are rarely criticized openly. Eventually they simply discreetly disappear from the collective memory. Narcissistic people, as exemplified by politicians, have this capacity to impress and to appear to have the right answer at the right time, adapting all the while.

Jerne did not like to participate in communal activities such as teaching, considering it a lower-class activity. Söderqvist notes that 'his duties as professor were confined to a couple of lectures per term to the medical students; furthermore, he declared that he did not want to teach microbiology, since it has nothing to do with immunology ("*bacteriophages don't make antibodies*")' (250).

Jerne viewed certain disciplines such as microbiology, so important for understanding the origin and function of the immune system, with contempt. This illustrates the perpetual need of narcissists to differentiate themselves from others. During his interview with his biographer Söderqvist, Jerne often referred to 'the happiness of feeling superior to a lot of people' and declared that he felt himself to be 'superior or more intelligent than other scientists'. He asserted that many of the researchers he had met were 'so stupid that the lady in the bread-shop is more intelligent than them, she has an awareness and an ability to observe and articulate her observations' (121).

Jerne excelled in the art of conversation, exercising a real fascination around him. It was one of his great talents, at the centre of his social existence. His colleagues noticed that Jerne often took an opposing position during discussions, which is a classic way of staying at the centre of attention. While he considered himself above the base material condition of the world, money was essential to maintain his high standard of living and was an important criterion for his accepting a job.

Jerne was married three times and was regularly unfaithful to his wives. His first wife, Tjek Jerne, was somewhat neglected by Jerne and later in life committed suicide. After an initial period of excitement, his second wife rapidly became essentially a domestic servant and nanny to Jerne's children. Jerne married a third time to what might be considered a trophy partner (see Chapter 5) and exhibited many features related to what could be called sexual narcissism. Studies have shown that narcissists are not particularly interested in loving and caring romantic partners who can provide them with real intimacy. Instead, they prefer partners who can enhance their image and their self-esteem: partners who have high social status or partners who are physically very attractive (Campbell, 1999). Experts in social personality used the term 'trophy partner' for a physically attractive partner that brings attention to the narcissist. Reading Jerne's biography, it becomes obvious that science at the

time was much less competitive and, for some scientists, consisted largely of talking and being part of a club of well-respected experts. The book also reveals periods of difficulty with alcohol in Jerne's life. Narcissistic personalities can be prone to depression in middle age, notably when they realize that their life does not fit their expectations (Debray and Nollet, 1997). Obsessed by their own image, they are also very sensitive to their appearance and to ageing. This is due to the fact that narcissists approach human relationships based on seduction rather than empathy, and more by a need to impress rather than to affiliate.

This portrayal of Niels Jerne reveals that the art of conversation and seduction, so essential for success in science, is also a great asset for narcissistic people. Narcissistic scientists are found everywhere, but their proportion is particularly high in research fields such as immunology and neuroscience, which are in the public's focus and more sensitive to swagger and catchy wording. Narcissistic scientists (and intellectuals in general) have a capacity to attract attention and to fascinate other narcissistic persons, this fascination greatly exceeding their real achievements.

In contrast to many scientific biographies that further contribute to the idealisation of their subjects, the biography of Niels Jerne by Thomas Söderqvist illustrates all of the facets of his scientific and private life, thus providing a unique opportunity to penetrate the mind of a narcissistic scientist. The reader can even sense the biographer's disappointment and disillusionment as he truly gets to know the person he had initially thought of as a great scientist.

Jacques Monod and his hard-core message on science objectivity

Jacques Monod (Nobel Prize winner 1975) was an important player in the early days of molecular biology, who worked at the Pasteur

Institute in Paris. He participated in the discovery of messenger RNA, transcriptional gene regulation and enzyme allostery. While there is no doubt that Monod was indeed a great scientist who made very important contributions, many of his colleagues found Monod arrogant and extremely self-confident. Monod was a worldly intellectual with a great desire to shine in front of other intellectuals, journalists and colleagues. One of his colleagues Arthur B. Pardee summarized his personality as follows:

> Jacques had a remarkable combination of personal traits: brilliant, polished, self-possessed, dramatic when necessary, and always on display. He could be kind and thoughtful to his friends, but arrogant and distant to those in whom he was not interested. Once a colleague remarked Jacques thought of himself as a Renaissance prince; indeed he acted like one. Truly, he was a man to respect and in many ways to admire. (Ullmann and Lwoff, 1979, 116)

While most scientists in close contact with him were fascinated by the genius of Monod, the following quotes from one of his close colleagues, Martin Pollock, are evocative of a 'complex personality' combining extreme self-confidence and a need to dominate.

> There are a few who, through ignorance or envy, have regarded Jacques [Monod] mainly as a conceited and arrogant egoist. There are others, dazzled by his brilliance and charm, who could see nothing but genius and virtue. But most of us, I suspect, feel he has a complex character who combined excellent talents with great ambitions. Looking back over the years, it still seems to me that his most outstanding characteristic – the key to understanding a number of otherwise puzzling and paradoxical features of his behaviour towards others – was a supreme self-confidence in his own ability. I never met anyone who had one-half of such a high opinion of himself as had Jacques.

> I remember challenging him once 'Do you feel Jacques, that you are alone in the world? That the world consists in a way of *you,* (on the one hand) and all the rest of humanity on the other?' I meant that basically he felt himself superior to, or at least better qualified than, most others. Looking (or pretending to be) rather self-consciously embarrassed, he agrees at once, with almost shattering candour. (Pollock, 1979)

It is interesting to observe that Monod's arrogance is physically perceptible, as illustrated in Figure 2. In fact, we will see in Chapter 12 that Monod's face showed many features that, according to evolutionary psychologists, signal dominance and high status. Monod selectively maintained friendships with highly distinguished colleagues such as Francis Crick, Salvador Luria and with the writer Albert Camus. He would invite them to his secondary residence near Cannes to sail on the Mediterranean. For him, being a scientist was to be part of an elite club.

Monod was a skilled orator and demonstrated impressive writing skills, spending hours polishing his articles to brilliance. Narcissist intellectuals often adopt a catchy or seductive style that can impress those outside their field. One of the most famous Monod quotes in his book *Chance and Necessity* is, 'Man knows at last that he is alone in the indifferent immensity of the universe, whence he has emerged by chance.' Atheist scientists high in narcissism seem to appreciate these kinds of depressing pronouncements, which dismiss traditional human beliefs and place science on a pedestal from where it can illuminate humanity with its cold light. Monod was a great supporter of the epistemology of Karl Popper and his hard-core message on science objectivity; Popper actually wrote the preface to Monod's book. Interestingly, Popper was also reputed for his high ego and was not easy to deal with, according to one of his pupils (Agassi, 2008). Although he was once viewed as the most important epistemologist of the twentieth century, his high standing

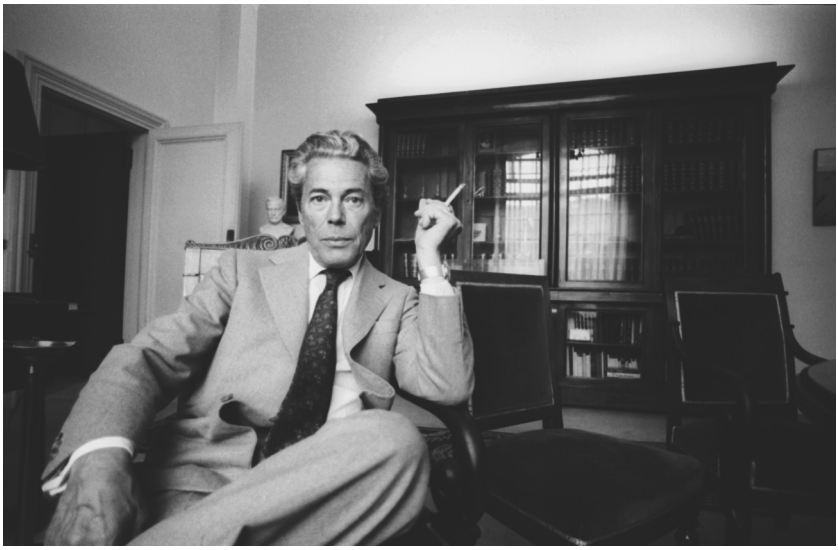


Figure 2: Jacques Monod, the worldly intellectual

A photo of Jacques Monod as the 'Paris intellectual'. Jacques Monod showed many features of a dominant-looking face, signalling high status – note his muscular face, the prominent chin and the heavy brow ridges. Did his dominant face and high self-confidence contribute to his Nobel Prize? The stature and self-confidence of Monod probably played a role in establishing the pre-eminence of molecular biology over zoology in France, and as such, all scientists working in molecular biology should acknowledge his importance beyond simply that of his discoveries. However, his arrogant attitude might have delayed the symbiosis of molecular biology and natural history that blossomed in other countries. Credit: © Corbis

in contemporary philosophy is currently fading, as he is understood to have sometimes recycled many ideas of other philosophers of the Vienna circle. Popper and his notion of falsification reached a great notoriety among scientists because he presented a rather heroic view of the scientific enterprise that flatters scientists. The philosopher Peter Godfrey-Smith wrote about Popper:

> He is associated with an outlook, a mindset, and a general picture of scientific work. His name has bequeathed us an ad-

> jective, 'Popperian', that is well established. But the adjective is used for very general ideas that, according to most current philosophers, Popper did not develop convincingly. His detailed account is often seen as attractive on first impression, but full of holes that become bigger rather than smaller as discussion continues. (Godfrey-Smith, 2007)

As illustrated for Jerne, the high-ego scientists Monod and Popper occupied an important position in their respective fields and are still a source of fascination. Social-personality literature reports that narcissists prefer to be admired than to be loved. Their personality is associated with a need to dominate, to impress rather than to get along with others. Intellectuals high in narcissism often fascinate by the use of catchy words and stylish expressions that fit the expectation of their public rather than reality. This explains why fascination often diminishes over time. Social-personality studies note that narcissists like to associate with individuals that either provide them with a direct benefit or who signal high status (such as celebrities). Narcissistic individuals tend to recognize one another and socialize, forming an elite circle. I expect that the figure of Jacques Monod will continue to fascinate scientists, notably those that are themselves high in narcissism.

Walter Gehring and his absorbent personality

Walter Gehring (1939–2014) was a prominent developmental geneticist who worked on the fruit fly *Drosophila* (see Figure 3). His laboratory analysed how genes regulate the development of an embryo from a single cell to a complex organism. His team contributed to the characterization of the 'homeobox genes', which encode proteins (also found in humans) that pattern the morphology of body parts. In 2014, he died in a tragic car accident aged 75.

The laboratory of Walter Gehring was a major scientific hub for two decades – a hot spot for discoveries and a strategic place through

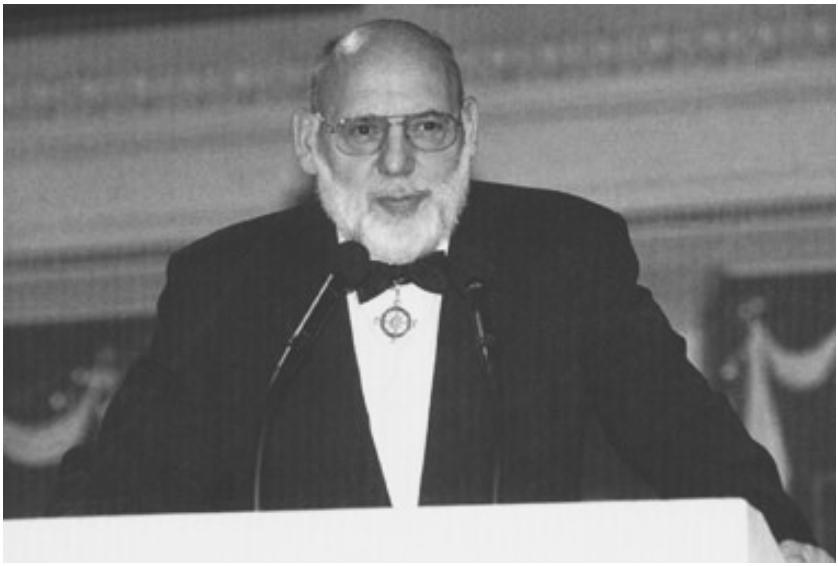


Figure 3: Walter Gehring and the figure of the Master Regulator

With his bald crown, his beard and his impressive stature worthy of an Old Testament prophet, Gehring was difficult to miss at a meeting. His physiognomy and his contribution to science made him the ideal candidate for inclusion in a scientific textbook. Scientists often like to start their seminar by placing their work under the auspices of a scientific legend. Figures of male scientists looking like biblical prophets (such as Darwin) or an elegant gentleman are especially appreciated. It is a way of underlining that the field is important. Credit: © Ordens Pour le mérite für Wissenschaften und Künste bei der Beauftragten der Bundesregierung für Kultur und Medien, Bonn.

which many scientists transited on the way to becoming key players themselves and creating their own laboratories all over the world. The premature demise of Gehring was marked by a series of eight obituaries, all written by former employees whose time spent in the Gehring laboratory had proven critical for their own success.

In contrast to Jerne, who incarnates the scientist so bright that he only needs to carry out one or two critical experiments to revolutionize science, Gehring was a naturalist who enjoyed observing birds and

who experimented in person in the laboratory throughout his whole life. Gehring did not exude an elitist arrogance as did Monod, in fact, he even contributed to a German zoology textbook for university students. So, was Gehring simply a great scientist, competent, but modest? In my opinion, this is not likely, as here and there we can glean evidence of his egocentrism.

Gehring was known for his unique way of presenting his team's discoveries as his own, often in the form of a funny story in which he would force a reluctant student to do the key experiment. The story often went like this: Gehring would ask a student in the laboratory to carry out a certain experiment, but the student would reply that it wasn't worth it and would not do it. Gehring would insist that the student do the key experiment, from which would come the great discovery. But discussions with actual students in question suggested another scenario: Gehring was often quite far away at the time of the experiments, for example, enjoying himself in a marine laboratory at a beautiful location. He also had a habit of quickly putting on his white coat when journalists arrived to visit his laboratory. A hundred years ago, Gehring would have featured prominently in science textbooks as being the only contributor in many discoveries, but our times are a bit harsher for these grand professors. It is even possible that his way of self-appropriating discoveries was counterproductive (he failed to get the Nobel Prize that he expected to receive), at least in his field. This might be because developmental biologists and microbiologists are usually less fascinated by the show than scientists in more medically oriented fields of research.

Another example of the 'absorbent' personality was described in detail by Peter Pringle in his book *Experience Eleven*. Professor Selman Waksman (Nobel Prize, 1952) dismissed the indisputable contribution of his PhD student, Albert Schatz, in the discovery of the first anti-tuberculosis antibiotic streptomycin in 1943 (Pringe, 2012). Waksman recounted many stories about Schatz, once describing him as 'a robotic and nameless assistant who followed orders from the

top but contributed no more to the discovery than the chicken from which the bacteria were isolated' and as an assistant with a difficult personality (Lawrence, 2012). A way of minimizing Schatz' contribution (quite classic among professors with an absorbent phenotype) was to downplay his involvement in favour of the overall laboratory achievement. In his autobiography, Waksman wrote about his assistants, 'They were the fingers of my hand . . . This teamwork might be compared to that of an orchestra, with the conductor leading and assigning the task to each member, none of which would have produced any symphony otherwise' (Pringe, 2012, 203). Although Waksman was strongly supported by the scientific establishment and was portrayed as a benefactor to humanity, Schatz' contribution was eventually recognized.

Seminars given by Gehring were characterized by a rather simplistic view of biology. For him, the master regulator gene (generally one he discovered) was at the top of a hierarchy, with many subaltern genes doing the smaller jobs. Did he self-project his position onto his understanding of genetics? Some of Gehring's fans would argue that he used his unique oratory skills to simplify his message during his seminars for the sake of understanding; others could claim that his vision of evolution and development was in fact outdated. Scientists often project a part of themselves in their talk. They are working on the *important master* regulator gene, which plays a *central* role at the intersection of many pathways. It is interesting to see how personalities can shape our vision of the world.

Gehring also selectively socialized with a number of very prominent European scientists, some belonging to the high-level political circle that distributed prizes. This socializing would sometimes necessitate going on safari in Africa with them, for example. At a more general level, this type of socialization is in fact very important for maintaining an influential position in the scientific landscape, such as being part of key foundations or evaluation committees.

As a side note, it would have been interesting to learn how Gehring

peer-reviewed competing papers and about his sense of conflict of interest. My experience is that egocentric leaders are able to take advantage of the scientific system in which most evaluations are anonymous. I have two anecdotes along this line, among many others (not related to Gehring). While talking with a Nobel Prize winner, I realized that he had acted as a reviewer for a paper written by a member of his own laboratory and published in the journal *Science*. I asked him frankly whether he considered it usual to act as a reviewer under such conditions, or whether it could be termed a conflict of interest. Self-assured, he simply answered, 'We just need to support good researchers!' Another story is about a director of one of the most prestigious hospitals in the US, who took information from a competing paper he was reviewing, extracted all the information and rapidly created his own paper that was then accepted in *Nature* one week later to be published back-to-back with the other. The first author of this 'cloned' paper now runs his own laboratory and has acknowledged in his talks the charisma and wonderful mentorship of his supervisor. In another situation, a student could leave science with a feeling of disgust. This illustrates an important aspect of narcissism that will be underlined several times in this essay. Narcissists emerge as charismatic leaders but the cost of their attitude is invisible, paid for by others. Science history is full of stories of self-appropriation by heroic and absorbent figures, who then are hailed in textbooks.

The best laboratories are often run by a self-centred personality that is able to absorb information from the field and establish the right connections. The self-serving biases, which characterize the narcissistic personality, explain why they do not see the cost for others. Students and postdocs who emerge from this type of laboratory often have mixed feelings about their professors. On one hand, they know the real man behind the show, with his egoistic behaviour or at best his naivety. One the other hand, they have to recognize that they owe their own position in the field largely to his self-centred personality

and the networking value of his laboratory. The contribution of dominant individuals like Gehring in establishing the perimeter of a scientific field explains why there are always hesitations when discussing their achievements. Fascination for such a scientist is usually the best way to self-justify our own success.

On a personal note, I feel a bit nostalgic for personalities such as Gehring, because he remained a naturalist his whole life and was quite different from some of the stars of today. There is a bit of the grandiose self of a child in him, with his naive way of occupying a prominent space and his passion for science. I should not be too critical of him because he boosted my own field of research, and I indirectly benefited from his influence over it. In addition, I could suffer retaliation from some of his fans, who are also my close colleagues! Compared to Jerne and Monod, I have by far more sympathy for Gehring.

Chapter 4

Detecting Narcissism in Science with Fictional Examples

A colleague working in social science once described to me the three most reputed professors in his field as follows. The first one is always charming, but there is no room for you in a discussion. He can talk about himself and his research for hours. Sometimes it's possible to enter into a conversation with him, but you need to connect the topic to his interests. The second one is charming and fun, with a sensitive personality, able to put delicate subjects into words and to provide you with the best advice. This man is also a hub, with a vast network of colleagues working for him, resulting in many books and essays being published under his name. He can extract a concept from an obscure and poorly written article, dress it in new clothes without mentioning the original article, and at the end get the credit for what was initially someone else's concept. I can't trust him, my colleague said, so I stopped telling him about my work; he is too absorbent and fast. The third professor is physically strong with an impressive muscular frame and a bald head. He can seem unpleasant on first meeting and tells you his thoughts in a direct and brutal way. At an internal seminar given by a close colleague, he once stood up at the second slide and said, 'This is just bullshit! Why should I waste my time with such nonsense!' Nevertheless, this third one does his own

research, and I know from others that he mentions my name when talking about my work, so I feel comfortable discussing my research with him.

These descriptions show that narcissism does not come in one flavour, although it can be noted that these individuals all possess a sense of self-importance and believe themselves to be superior or special. The most dangerous might be those who are warm at first acquaintance but who later reveal their self-centred nature. This diversity underlines the fact that narcissism is a complex personality taxon with multiple facets. This text also illustrates that an objective definition of a personality does not exist, but is always referenced to the judgment of the evaluating individual, which never happens in a neutral way.

To continue our analysis, we will now explore three examples of narcissists using fictional examples or prototypes. We will contrast the traditional figure of a grand mandarin, still prevalent in many countries, with two more recent prototypes of a narcissistic scientist, emblematic of our times of globalization and mass media pervasion.

The grand mandarin

In places where science is regulated by complex policies and a multi-layered administration, it is customary to maintain a boss with a narcissistic character at the head of the laboratory: the grand mandarin. Although this type of leadership is now declining in Western countries, it is worth analysing as it helps us to understand how science functions.

Not necessarily chosen for his scientific rigour, but rather for his natural expertise as an intriguer, networker and seducer, the mandarin is there to dominate the scene and to extract the maximum amount of money from an intricate administrative system. The team works for him in such a way that he can get awards and money, which he then feeds back to his colleagues, creating a system of

dependence ('tit for tat'). When his ego fuses with the ambitions of the lab, the advantages of a narcissistic boss are obvious: the address book, the notion of self-importance and the art of conversation, the links with editors that open doors to publication in esteemed journals, but also and more troublingly, for instance, the lack of empathy needed to eliminate a loyal collaborator who has become cumbersome. This double-faced personality allows the mandarin to exploit the particularities of a complex administrative system. Politically they may complain about the ponderousness of the system, but in the background all their actions go towards maintaining it.

Sometimes the science carried out in these big hierarchical labs is exceptional, but most of the time it is actually rather average. Never describe their work as 'average' though, because the mandarins will be very upset! Fortunately for them, quality scientific output is not the only sign of success and power, which can also be demonstrated by a state-of-the-art building, often with a cold glassy façade that impresses, or a cortege of well-chosen female students.

Narcissistic people are usually extremely sensitive about their status and towards those who might cast a shadow over them. They do not usually directly destroy their competitors, but maintain them in a modest position. They still need admirers! This is due to an innate capacity of these averagely talented mandarins for belittling the achievements of others, as it prevents the emergence of potential competitors who may very well be better scientists than themselves. This is greatly facilitated by a good network of powerful friends, diligently maintained at the top of the hierarchy. Narcissistic people are often good at seeing faults in others but are usually bad at assessing their own shortcomings: 'high outside magnification and low inside resolution' (see Figure 4). This is not a specific feature of scientists, but it is surprising considering the objectivity associated with this discipline. Usually far from the workbench and the concrete realities of science, mandarins are always present at important events where they can selectively socialize with important personalities. The history

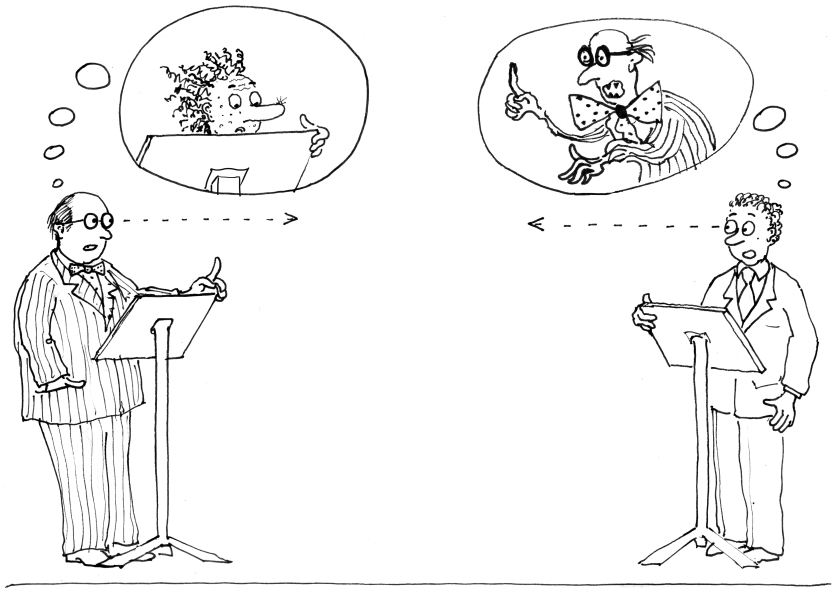


Figure 4: High outside magnification and low inside resolution

Narcissistic people are often good at seeing problems in others but are usually bad at assessing their own defaults. Narcissism is associated with entitlement and a feeling of 'special status'. Perched on the invisible pedestals created by their egos, two professors analyse and magnify each other's defaults.

of science often reveals aggressive rivalry between different schools of research; this can be linked to the narcissistic characters of the respective leaders, which exacerbate the differences in interpretation, but also allow them to occupy the scene. If their respective political interests favour it, opposing camps can sometimes be reconciled.

If a scientist is negatively targeted by a powerful narcissist colleague, he should consider changing his research field or leaving science altogether. Let's not dwell on all the students who have been burnt by a great mandarin – they count for nothing to these great

men and their version of the history of science. Should the opposite be true, however, and the scientist is favourably viewed, mandarins can be the most caring patrons possible, and since they have fast-track access to funding and positions, they can make careers, even if only to ensure the loyalty and gratitude of those in their debt. For a long time (and even now in some places), having a career in science was a question of navigating around strong personalities and trying to gain their favour, or just sticking it out until they retired or more frequently died. Even dying might not be sufficient as there is such a thing as a hereditary monarchy in mandarin-type science. When the director of a big institute retires, he often wants to leave 'his' house in the care of an academic protégé, that is, a favourite former PhD student. The rise of his protégé to the post of director ensures the self-perpetuation of the departing director.

Even after retirement, mandarins still retain the bulk of their former influence, due to their networks and fast-track access to good journals. Convinced that their field will decline without their presence, they maintain control over their own research field, even in their later years. But even a mandarin eventually dies, and when that happens, the emotions are perceptibly similar to those surrounding the death of a monarch or a dictator. Everybody is present – students, colleagues and academics, those who wish to demonstrate their loyalty and those whose careers were launched by the deceased – a procession of scientists expressing sadness. 'He left his mark on the scientific world' proclaim newspaper headlines. And now the time has come for the mourners to play their hand. Some were rebels in their youth and criticised the system, up until they had to build networks and forge their own career. But time has passed and their narcissistic traits have hardened; their youthful rebellion turns out to have been an indication of their sense of self-importance. Now, they are the ones who exploit the system and prevent the rise of younger competitors, while grooming loyal successors. Some of the dead mandarin's trusty colleagues expect their part of the inheritance

– the empty faculty chair, the rich foundation with its many perks. In the institute, this is the eve of a serious battle; the fight for succession has started. All the egos that were kept at bay by the grand mandarin have awoken with great expectations. It is the most important time of their lives. And so the complex game of alliances, dirty tricks and narcissistic wounding of other sensitive big egos starts. A few months later once the dust has settled, we might hear a technician reminiscing that 'it was better before, when the big boss was still around'. But actually, experience shows that science survives perfectly well even after they are gone.

The traits associated with narcissism explain why some people have an innate ability to dominate the scene. This includes the good serious face that implicitly tells their entourage that their research is important but also their willingness to use resources without any scruples or any sense of a possible cost for the community as a whole. This provides advantages in a system that monitors production and not productivity. We can understand why these innate leaders have supporters that praise their qualities – because of their fast-track access to resources that are usually difficult to get. Mandarins (with the help of their network) have the capacity to prevent the emergence of newcomers by the discreet depreciation of scientists at key steps in their careers. They usually promote young researchers who are loyal and respectful in a tit-for-tat manner. Nepotism is a self-enhancement strategy shared by both narcissistic professors in science and dictators.

Another common point between very successful narcissistic 'grand professors' and powerful dictators is that they cannot leave their business. Narcissistic scientists tend to literally die in the lab, always viewing the world in the light of their last discovery. In their mind, they believe that they are indispensable, but in fact, they cannot escape their own self-enhancement strategy and the threat to their ego that falling down the ranks or of being forgotten represents. This difficulty in retiring within an appropriate timeframe is easy to un-

derstand given their strong dependence on admiration from others.

This self-serving bias, that is, the tendency to claim credit for other peoples' success, while blaming failure on others, is a part of the dynamic of many of these leaders. Note that a bottom-up analysis of their activity (that would not just take into consideration the impact factor of their publications, but also their 'predator impact' and really measure productivity including all cost carried by the community) would certainly send many of these grand mandarins back to the rank of common mortals. Horror!

The American operator or Harvard type: Is he really different from the grand mandarin?

Narcissism in science can be found in various forms depending on the culture. It is possible to distinguish the Cambridge type, classy and haughty with the appearance of objectivity and his network of friends from his collegial past; the Greek or Italian scientist with his visible and turbulent mafia of fellow countrymen; the voluble Indian leader; the New Yorker with a joke every second sentence and a gigantic address book; and the Japanese leader . . . No, sorry, Japanese leaders are not usually very good at overselling themselves. With rare exceptions, Japanese have to work harder or be lucky in order to be internationally recognized!

Here, we will focus our attention on the aloof Harvard-type leader that you find in top-notch institutions, a type of scientist whose scientific dogmas and regular high-impact publications dominate their respective research fields. This type of scientist is sometimes called an *operator* because he acts at a level above the simple management of a laboratory. How are the American big boss and the grand mandarin different? Well, there are a number of differences: the grand mandarin got his lab by bestowment or inheritance as described above, while the American leader built his career based

on evaluated performance, such as paper output and grant acquisitions. The mandarin is not really competing with anyone, but instead cements inherited power through his unscrupulous politics. In contrast, the American operator has probably spent more time doing experimental work during the early stages of his career; bench work has the virtue of developing modesty and counteracting the expression of narcissistic traits.

But while the Harvard performance model may appear rational, fair and highly productive, the real situation is more complex. Both systems favour narcissistic personalities, and with age, the differences vanish. The philosopher Gaston Bachelard made this cruel statement about scientists: 'These great men are useful to science in the first half of their life and harmful in the second' (Bachelard, 1999). Certainly, Bachelard was referring to the mandarin type that still dominates the landscape of continental Europe, but he was also referring in general to the transformation of function that occurs when we get too much power.

With a big laboratory, a large network of 'friends' occupying similar top positions around the world and connections to editors with fast-track access to prestigious journals, the operator Harvard-type leader is a hub in his scientific community. His position gives him an overarching view of the field, with huge grants and major papers passing through his hands. But the tacit line that defines a conflict of interest in reviewing ceases to exist when they themselves are concerned, especially because, as narcissists, they are set up to believe that they are *special*. There have no ethical issues around reviewing a paper that is in direct competition with their own lab, delaying a competing paper, or sharing confidential information with friends. These operator types are easy to recognize, with their aura of coldness and ruthlessness, very sensitive to their rank. They are not much fun to be around, although alcohol can help to break the ice. For them, money is not an issue since they are doing the most important research. They run the type of laboratory that all ambitious

young researchers strive to work in. Why? Not just for the quality of the science but also for the network, the facilitated access to journals and perhaps even the professor's lack of scruples. All of this is tacit and hidden behind the screen that success provides. The American operator's attitude is mirrored in his tendency to build a science conglomerate with his own brand name and corporate identity, including the many around-the-world franchises of former postdocs and PhD students. His lab grows and expands, sometimes into additional labs in different faculties, universities and even different parts of the world. The busy operator actually takes pride in not knowing how many people work for him or not being able to connect a name to an employee's face or even that face to his own lab.

When one of these big shots visits a grand European mandarin, there is courteous discussion; despite the contempt of the American toward the too-political mandarin, he clearly sees the interest in establishing a link. Everything is tacit, after a good dinner in a restaurant and some small talk they begin to work hand-in-hand to increase their stranglehold on the field.

As suggested by social-personality studies, narcissistic personalities are frequently encountered in top management positions. The lack of transparency and the apparent objectivity that prevails in science give an enormous advantage to narcissistic professors who often lack scruples and tend to establish reciprocal alliance with key players in the field. These leaders are attracted by top-notch institutes that provide key elements for succeeding in science: a network of relationships and the ability to satisfy the narcissist's feeling of specialness. These leaders are super-elitists – for them, science should be just like the top league in football; they consider themselves to be high-profile stars and have similarly high-profile expectations (big laboratories, higher salaries). The most narcissistic young scientists move there, not just for the high quality of research, but mostly because the name of the narcissistic professor is a key that opens the door to success. It is also in this type of laboratory where they learn the internal rules of

the game, how extreme self-confidence leads to success. Universities fight to attract these important professors because they have their fast-track access to journals, funding and glory. But when they are recruited, they have little sense of community. Scientists who work in close proximity to these big laboratories often observe the waste, the amount of money spent on networking and communication and the hordes of disheartened students and postdocs who have failed to acquire the corporate identity way of thinking.

The visionary scientist: Big Ideas, Big Science, Big Institute (and Big Ego)!

To conclude this short series of portraits, we will analyse a peculiar type of scientist high in narcissism: visionary scientists. They bear certain characteristics of both the grand mandarin and the American operator – like the mandarin they are generally rather average scientists with an unimpressive publication output, yet, as with the American operator, they are highly successful in attracting tremendous funding and publicly promoting their research. Unlike a grand mandarin, their power lies not in the silent networking and behind-the-scene politics, but in their high media coverage and their charm towards politicians, investors and the general public. In essence, they approach the scientific enterprise as if it were an innovative start-up company: using their ideas to attract investment money.

A number of years ago, many scientists used to be Marxists; for them, the business world was absolute evil. The visionary scientist, however, has no problem mingling with important members of the business and political world, simply because 'his' grand science idea needs them. You could be forgiven for thinking he earned his science degree in a business school; he is a born salesman and excels in his interactions in extra-scientific environments. Although everybody recognizes his dynamism, a naive scientist colleague might wonder

how this person got such a prominent position in the field. In fact, he has published few original papers, which are often not taken seriously by his scientific peers. An in-depth analysis will probably reveal that he got his foot in the door by publishing one or two redundant articles at a critical moment of his career in a previously hot field, recycling and twisting the ideas of others. He might also be credited for one of those sexy keywords, for example, he postulated the existence of a 'machinosome'! In fact, careful analysis by a close expert in the field will reveal that the overuse of this poorly defined terminology confused the field for ten years, because the reality later proved not to fit his original prediction. He is naturally involved in many recruitment panels and committees and has a high position in his university where his strategic visions are acknowledged. He is especially interested in recruiting a new class of scientists: those who think *outside the box* and have a *strategic vision*. This is actually his demanding way of doing research.

Using his persuasive power with investors, he has indeed developed a promising start-up. Nobody inside the enterprise is convinced they'll get anything tangible onto the market, but this business-like research activity is good for the university's image, and there is even hope they'll hit the jackpot. Yet this rising star also has many academic friends in the field who are clearly classic scientists of the grand mandarin type. Fraternal relationships between these important men mean a number of favours done at key moments in their careers, allowing them to maintain their leadership.

In between meetings (he is always extremely busy, rushing from the airport to his next commission), he is needed by the government to help a ministry organize the next funding round. How do we best deal with this plethora of small research groups doing their small pedestrian science? How do we decide which is the best and which do we fund? He will propose selecting applicants based on their *strategic* content; science should be searching for new *frontiers*, with a clear *translational* dimension. The perfect words which every

minister responsible for the distribution of public funding loves to hear. Indeed, how often do we read in the news that more money is to be invested into applied science, which is clearly so much more useful for our society than mundane basic science. The visionary scientist also proposes a new type of funding called *clusters of excellence*, which is selectively designed to support a network of elite universities and help them emerge from international competition and increase the visibility of the country. The minister literally swoons with exultation. Coincidently, the visionary scientist actually works in one of these elite universities, doing applied translational excellence research that then becomes extremely well advertised.

Although he does not participate in low profile activities such as teaching, his projects have an important educational dimension. He is not like the old-style scientists who stay in their ivory towers. During his presentations, he identifies with the diseases he is fighting; heartfelt and sincere, he speaks of the sufferers among his inner circle, all to promote the necessary financial effort of the community to fight this disease with him. At the end of his talk, two Spanish professors will leave the room moved by his charisma and his ambition. Yet during the meeting, both of them complained about the lack of money being invested in their research. Their brains haven't made the connection as to where the money is being channelled.

His professional life has been a succession of jumps into new projects that use the most recent next-generation or the next-after-next generation technology. These projects are always designed to attract a maximum of media coverage and are all inaugurated with great pomp. When one project reaches its end, it is unclear whether any real discoveries (called deliveries) were made at all and whether any of the initial expectations were fulfilled. But this is actually no longer a problem because he is now inaugurating another project that will address a new important question. He is the type of agitator that journalists and politicians love. Not long after, the main goal of his life becomes the creation of a new institute devoted to research on

this now-famous disease. He has succeeded in convincing everybody that this is ideal timing. An analysis of his talk reveals overuse of terms such as *new*, *unique* and *special*: 'Of course, our institute will be *unique*: a *new* type of organization for a *new* type of science that will answer the *new* challenges of the world'. Continuing with his use of key words, he will also reiterate the necessity for building a *complex multi-taskforce* to address an *unprecedented challenge* of our time. But to (paradoxically) conclude his exhortation, he will reveal that Harvard has already launched their own institute with the support of a 200 million-dollar grant[1]. A few years later, he will invite other important institute directors to the inauguration so that they can understand his achievement. This institute will be special!

Scientists high in narcissism view science as a collection of trophies for others to admire. Narcissism implies a higher dependence than usual on the regard of the other because narcissists seek admiration. This explains why scientists high in narcissism find the right words to please the expectation of politicians. Because of this aptitude to fit the expectation of others, there is often a feeling of exaltation and ease when we enter in a relationship with them. Experts describe this type of leadership as visionary; they have grandiose visions, but they lack the specific details. They are seen as visionary because they meet others' expectations, but they have no scruples about celebrating themselves and no sense of the cost for the larger collective. Their

1 In this period of economic recession, it is worth analysing in slightly more detail the discourse of the visionary scientist. According to his logic, there is urgency and a need to invest a large amount of money to avoid the risk of falling behind (and actually there is always a real or possible competing project in other elite universities). To avoid this, a new type of organization and leadership is required, one that cannot be achieved by normal channels and thus necessitates substantial investment. The presentation talk is usually very abstract and lacks specific details; the visionary scientist is often an opportunist with only superficial knowledge of the literature. All these features perfectly reflect the narcissistic mind (specialness, competition, leadership, network and visibility) with his ability to meet others' expectations.

energy signals (notably to journalists, the lay public and scientists with the same personality) that something is 'happening'. Most of the time, a large amount of money is burnt by these oversized projects. Sometimes, this can lead to concrete successes, but most of the time any real achievements are actually an indirect consequence.

Running science as a start-up, they have no problem being pushy and overselling their science. They can find arrangements with the truth, at least in the early stages of their career when they need to emerge. Their papers, forceful and cleverly worded, yet light on detail and at times even partially incorrect (qualified as 'pushy', to use the jargon of the scientific community), allow them to get the best funding, increase the size of their laboratory and then move to the next story. This perpetual agitation mixing self-confidence and impulsivity also prevents the triviality of the visionary scientist's research from being revealed. As often observed for narcissists, they excel at selling their ideas outside their own community, but close experts are often less convinced.

Concluding remarks

All three scientist-types described above display narcissistic behaviour patterns. All feel entitled and place themselves above their peers, whom they use as tools to promote their career. All are skilled net-workers and as young scientists establish their careers by convincingly presenting themselves as the most competent, most dedicated and most loyal. The visionary is best at selling his ideas, the operator at appearing to be the most efficient and productive, while the grand mandarin knows exactly how to manipulate influential people for his own means and promotion.

A narcissistic character is often detected by small details: a greater attention to style and oratory expression, an attention to titles and awards. His diploma and prizes are displayed on the wall of his office, he is likely to pay special attention to clothes, have a sophisticated

hairstyle, and engage with important acquaintances. The sexual behaviour of a professor is often a good indicator of narcissism as well. It is time to explore this fascinating aspect of narcissism, which was earlier briefly touched upon when discussing Niels Jerne.

Chapter 5

The Love Life of Narcissistic Scientists: Poetic Adventure or Adaptive Strategy?

The philosophy of Jean-Paul Sartre delivers a strong message about human freedom and the weight of personal choices and achievements in a nonsensical universe. Throughout his life, Sartre engaged in frenetic sexual activity, notably with teenagers (Yonnet, 2006). An interesting question would be to know whether this licentious sexuality was the deliberate choice of a free and independent thinker or rather a compulsive sex obsession, due to a high level of testosterone. While many intellectuals can appear egalitarian and generous in their discourse, (e.g., by combating capitalism, as exemplified by Sartre who was communist), they are often ready to use their dominance and power in order to gain access to sexual mates. Interestingly, the compulsive type of sexual activity exhibited by Jean-Paul Sartre has many features evoking narcissism. It is more driven by excitation and self-centredness than by empathy towards the partner.

The link between narcissism and sexuality has been recognized since the characterization of this personality (Campbell, 1999). Narcissism in the romantic domain is associated with various behaviours including compulsive sexuality, opportunism and a game-playing

conception of love, and an attraction towards celebrities, career-promoting partners or a trophy spouse. This is often the concept of love exhibited by celebrities on television and by artists and singers. While Niels Jerne shows features related to the unbridled sexual activity of a Sartre, in the scientific domain narcissism comes in different flavours when influencing the mating pattern of professors. It is now worth exploring examples of how narcissism can influence the choice of a sexual partner in a scientific environment.

Although scientists are great intellectual adventurers, they do not usually go very far to find their partners. This is facilitated in life sciences since there are plenty of young women around. For a ruthless narcissistic scientist in search of career and power, the choice of partner is less romantic than practical – one can choose either a partner who could be directly useful for career promotion or a beautiful girlfriend who would help draw attention towards the narcissist. They are rarely the same woman! For the most advanced narcissist, this dilemma will be resolved in a sequential manner. For an ambitious scientist, sexual partners are chosen strategically – the secretary who will be useful at keeping the institute under control or the excellent technician who is invaluable when the pipetting gets too difficult. Even better if they turn out to be good mothers and take care of the family when it becomes necessary to travel for networking. Some have speculated that this two-body lab management also maintains a relationship based on the partner's dependence and admiration.

Another good target is a prominent female leader in the field. Their everyday passion for science is kept alive through ceaseless discussions from breakfast until late at night. Importantly, this type of interaction will also form a stable and efficient embryonic network for maintaining their supremacy over the field. In some cases, the mating partner can run her own laboratory working in another institution; although this situation does not provide a direct benefit, it sets up a useful and almost indefectible alliance that increases network ability and access to resources. In other cases, the couple

work in the same laboratory or in two laboratories that become so close that they could be considered as one. Science is run as a small family business mixing private and public life, and lab members are often considered to be the professor's children.

I have to admit that a couple working together in the same laboratory or on a similar thematic is an efficient way of running scientific projects. Sometimes, this is also a way of extracting maximum resources from a public organization, because the alliance created by the union boosts the career of both partners. However, it is important to underline that this type of arrangement is not formal evidence of high narcissism. Much more symptomatic is the opportunist professor who changes his mating partner when changing field, or who moves on to a more established mate, or the one that sacrifices his family after one too many household moves, incapable of resisting the attraction of an institution with a brand name.

Some other mating choices can appear even more strategic, such as a great love for a young female editor at *Nature*, useful in the early stages of a career (this was a real case that resulted in ten papers being published in the journal *Nature* over the course of the romance). But the situation can sometimes also be inverted. A very discreet scientist in France was catapulted to the head of an institute once he set up an alliance with an older and extremely self-centred, but very influential, female scientist, without causing any rage or frustration among the other candidates.

During a narcissist's mid-life crisis, the useful partner may no longer appear so useful now that success has arrived. This is also the time when the once-charming little habits of the spouse really start to get on his nerves. This aspect is exacerbated in narcissistic personalities that are adept at seeing problems in others. For narcissistic leaders who now have an enviable position, this is the time to change to a fresher, trophy partner who they will inevitably meet at a meeting or in their cortege of students. This new romantic partner is generally at least 20 years younger, well groomed and, surprisingly, often a direct

employee, usually a PhD student or postdoc. This lab arrangement is indeed such a cliché that if you should know any narcissist professors personally, feel free to search among their employees for the current romantic partner. Chances are, you'll spot her (or even him).

The arrangement works to their mutual benefit – the narcissist scientist feels young and virile, and his young partner will be rewarded by the best patronage possible. She is free from all the menial tasks her colleagues must do, and at the same time she is also the (not so secret) spy in the lab of her boss and lover. When this arrangement happens to our previously described grand mandarin, this is one of the rare moments when his personal agenda does not fit with the objectives of the lab. Yet no one will ever dare to complain, in any case, everybody in the laboratory has to accept it: the boss has done so much for the lab!

Although narcissistic people are usually very hard-nosed in terms of publications and ranking, when considering their own romantic partner, they can be blind to their actual lack of talent, always

➤ Figure 5: Niels Jerne and his trophy partner

Niels Jerne exhibited many characteristics of high sexual narcissism. He was married to an artist, Tjek, who ended up domesticated and neglected, and later committed suicide leaving behind two children. Jerne engaged in numerous infidelities and is said to have enjoyed sadomasochism (Söderqvist, 2003). Later, he married Alexandra (shown with Jerne in photo), a trophy partner who helped him remain the centre of attention. Social-personality studies have shown that engaging in a relationship with a narcissist initially feels more exciting. It is likely that the feeling of being special and important to the narcissist could evoke a rich and interesting life in potential partners. But when the partner can no longer feed the narcissist's ego, he loses interest and moves towards a more exciting relationship; this quick change is made easier by the narcissist's lack of empathy and their capacity to systematically belittle their partner, now seen as an obstacle. Partners are fully interchangeable due to the self-centred perspective of the relationship. Credit: © Medical History Museum, University of Copenhagen.

enthusiastically supportive until the relationship eventually breaks down. Their new romantic partner from the lab will be first to get promoted, introduced to all the right people and will feature prominently on every relevant publication from that lab. She is now part of him, part of his self-enhancement strategy. Everyone will be brought in to promote the young star. 'As you know, she is brilliant and innovative'. All the members of his network will help – academicians and good friends. The winds of fortune blow in the right direction and, several years later, a new star of science is born. At the celebration party, everybody plays their role so naturally, putting on a façade of happiness!

In his scientific autobiography *Neanderthal Man*, popular anthropologist and Max Planck Institute director, Svante Pääbo, describes in great detail his personal scientific endeavour to access the sequence of DNA from ancient humans. He also briefly relates how he came to be in a relationship with the partner of one of his male colleagues in the department (Pääbo, 2014, 89–90). After describing the acquisition of his new sexual partner, he wrote: 'Luckily, Linda was able to find a job at the institute,' and a few lines later, 'Linda ended up heading the genetic laboratory in the primatology department.' The term 'luckily' is in fact surprisingly appropriate to describe the change in destiny resulting from this new alliance. While this may not apply to the present situation, thanks to the tacit understandings and 'tit-for-tat' mode of functioning within many professors' networks, the new partner does always 'luckily' find the right job. It is difficult to resist the temptation to project the social dominance relationships observed in primate society onto academic life, with the transfer of a mate from a subordinate to a higher ranked member. How often the institute is the mating ground for prominent professors!

Most scientists have rather reasonable personal relationships, enjoying a peaceful family life, which is positive for their long-term equilibrium. One study suggests that having children has a positive effect on the productivity of male scientists, while it is neutral for

female scientists (Feist, 2006, 134). For many, science is already a complex world, difficult to navigate, and they do not need to add more trouble to their lives. The degree of self-absorption and passion, with the ups and downs present in science imposes constraints on family life and explains in part why scientists often stay together.

The sexual behaviour mentioned above is not specific to science but is also observed in arenas of power and media exposure, such as the arts, politics and fashion. It is nevertheless interesting when we consider science's so-called objectivity. Narcissism influences the personal love life of professors in multiple ways, allowing either the establishment of alliances reinforcing the position of the professor in his institute or field, or illustrating his power, for instance, with a trophy partner (see Figure 5).

It is important to underline that the mating behaviours described as strategic are mostly unconscious, being the consequence of a personality. A narcissistic professor will fall deeply in love when engaging in a relationship with a colleague likely to increase his impact in the field. Niels Jerne with his rotating wives or multiple one-night stands shows an example of extreme sexual narcissism. This also reveals the charm and force of seduction of narcissists. More characteristic is the professor who successively engages in one, two or three new relationships with young postdocs or PhD students. Another figure, more traditional, is the grand mandarin, so respectable when together with his colleagues but who cannot refrain from inappropriately touching female students. Because of this kind of behaviour, certain American universities have established rules ensuring that professors always keep the doors of their office open when in the presence of just one female student.

Although narcissists often use a sexualized language and have more pronounced sexual fantasies than others (Campbell, 1999), sexual narcissism is not a systematic symptom of this character, and many high-ego professors have peaceful family lives. It is nevertheless very interesting from a biological point of view – as we will see later, some

hypotheses in evolutionary psychology relate the underlying biological basis of narcissism to the strategy of short-term mating. The accelerated career advancement of the narcissist's female partner tells us a lot about how science is managed despite its supposed fairness.

Part II

How Narcissism Affects Scientific Practice

Chapter 6

Of Personality and Science

The psychology of science remains a modest field of research compared to other approaches analysing how science works, such as history, sociology and the philosophy of science. In his book *The Psychology of Science and the Origins of the Scientific Mind*, Gregory Feist, one of the rare professional psychologists devoted to the study of the scientific community, discusses the challenges of this emerging field and the reasons why it has remained a modest field until now (Feist, 2006). It cannot be excluded that scientists prefer this unrealistic image of themselves, sheltering behind the image of modesty and unconditional sacrifice to their studies. Considering the amount of money spent by universities to attract the best scientists, the study of how personality influences scientific achievement is of broad interest. A naive view, which might flatter some scientists, would consider scientific achievement to be mostly due to intelligence. This idea is in fact negated by a study showing that intelligence and creativity are moderately related up to a threshold of intelligence, around 120, and then the relation falls to essentially zero. As stated by Feist, 'a threshold of intelligence is required for creative achievement, but once one gets slightly above one standard deviation above the mean, more IQ points do not bring anything to the table' (Feist, 2006, 149). The importance of personality in scientific success has been revealed by a large longitudinal study spanning years, comparing how personality and intelligence predicts career outcome and creative achievements.

The authors, Frank Barron and Feist, observe that personality rather than intelligence is a better predicator for success in science (Feist and Barron, 2003).

In a quantitative review (meta-analysis) of twenty-six published studies comparing the personality scores of scientists and non-scientists, Feist reports that scientists are more introvert and tend to be higher than non-scientists on openness to experience (e.g., open to new and alternative ideas) and conscientiousness (e.g., organized and self-disciplined) dimensions. Scientists, especially physical scientists and mathematicians, prefer to be alone, are somewhat less social, and are less likely to make affiliations than non-scientists. Interestingly, other personality traits more salient of scientists compared with non-scientists are dominance, arrogance, hostility, self-confidence, assertiveness and ambitiousness (Feist, 1998). Moving to the delicate question of whether personality traits are linked to eminence, Feist reports that the traits of arrogance and hostility are most noteworthy among highly creative scientists compared to their less creative peers, who are in turn higher on these dimensions that non-scientists (Feist, 2006, 121–2). In addition, eminent scientists have lower scores on the conscientious scale than other scientists. The prevalence of traits such as arrogance, hostility, self-confidence, assertiveness, ambitiousness combined with low conscientiousness in eminent scientists confirms my idea that narcissism is quite prevalent is successful scientists. A limit to these quantitative analyses is that terms such as 'eminent' or 'creative' not only refer to real achievements and to contributions to the community, but also to the ability to be recognized by one's peers. As scientists, we all know that a certain quality, pejoratively referred to as being 'political', is often necessary to reach the highest scientific circles. A psychological analysis of science would require psychologists that truly understand scientific content or that team up with scientists, and this make such studies difficult.

While researchers in psychology use quantitative assays such as

personality questionnaires or tests to address these questions, my essay is not a rigorous psychological analysis but rather a personal view from the inside of a particular scientific community. It compares the behaviour of individuals within a scientific community but does not analyse how scientists tend to differ from non-scientists. The following three chapters will try to conceptualize the complex relationship between the narcissistic personality trait and the practice of science, and try to understand why narcissism brings an advantage in the present system. It is important to reiterate that social-personality research establishes narcissism as a trait for which there is no threshold. Humans tend to differ in their levels of narcissism. We can speculate that there is a continuous range – at one extreme there is an idealized meticulous scientist, who lacks self-confidence and who is hesitant about using and wasting too many resources; at the other, there is the extremely self-confident character, who talks boldly and sees no problem in taking the biggest share. Hence, the mechanisms for analysing the influence of narcissism in science described below are also likely to apply to people who are not narcissistic.

This analysis is also complicated because narcissism comes in different flavours. In life sciences, we are familiar with the previously described visionary scientists running science as a start-up, overselling their papers and jumping from one big story to another, while burning a large quantity of resources. But narcissism also includes deep thinkers such as Niels Jerne or the Parisian intellectuals with their unusual verbal skills – a dominant attitude that creates fascination around them.

Are there personality traits associated with scientific inquiry?

Following the path of Michael Polanyi and his tacit dimension, it is worth exploring the links between certain personalities and scientific

practice. The present essay has mostly underlined the bad sides of narcissism, but a certain dose of narcissism is certainly required for the practice of science. Polanyi speaks of 'intellectual passion' as a major facet of scientific inquiry. By 'intellectual passion', Polanyi means a kind of self-sustaining, endless and passionate quest for knowledge. Many scientists will acknowledge that the obsession with one's centre of research is in fact the mainspring of all inventive power. Asked by his pupils in jest what they should do to become 'a Pavlov', the master answered in all seriousness, 'Get up in the morning with your problem before you. Breakfast with it. Go to the laboratory with it. Eat your lunch with it. Keep it before you after dinner. Go to bed with it in your mind. Dream about it.' (Quoted in Polanyi, 1962a, 127). The importance of self-absorption and passion would explain why recent immigrants are often the driving force in laboratories. Passion for science is more likely to be obtained with immigrants that have lost their social and family links. Italian, French or Greek scientists usually succeed better when exported to a foreign lab, as they lose the roots and intense socialization of their native countries. Then, the laboratory becomes the place and object of socialization and their research has more chance to become the centre of their life.

Polanyi attributed three values to passion in science – *selective*, *heuristic* and *persuasive* (Polanyi, 1962a, 159). To explain these, passion is *selective*; it gives a high value to one problem among many others, which then becomes the object of passion. As such, scientists are usually obsessed by a narrow set of questions and forget the surrounding world. Passion has also a *heuristic* value; it maintains their energy along the discovery path and allows them to constantly think about the particulars of a problem in an obsessive manner until a solution emerges (which is also the source of intense satisfaction). This discovery is then the starting point for a new inquiry, perpetuating the passion. Passion also contains a *persuasive* value; it convinces others of the importance of the findings. On these

three points, and notably the last one, a certain dose of narcissism is positive. Narcissistic personalities tend to be passionate and to attribute a high value to their lives and actions. What they do is so important! In addition, they are highly motivated by success and usually perform better when there is a chance for reward. Science is attractive in this respect, with the opportunity for publishing articles in trophy journals, prizes and for the lucky few, the opportunity to build a long-lasting scientific legacy. Narcissistic traits help to convince others of the importance of research themes and findings. Narcissists are also very good storytellers who coin keywords and expressions that match current trends. The influence of narcissism on the persuasive power is so important that it will be described in further detail in the next section.

Other aspects associated with narcissistic traits can be positive for scientific activity. In some ways, the 'high outside magnification and low inside resolution' and 'self-absorption' of the narcissistic character fit well with the obsessional quest of the creative scientist. As professors, we also know that collaborators with too much empathy for others and that are not self-absorbed enough, although highly considerate and caring towards their own teams, are usually not optimal for succeeding in science because they disperse their energy socially. Narcissists are hypersensitive to even a simple critical comment on their research, taking it as a personal attack. This tells us that they tend to associate their scientific achievements with their own person. It is therefore expected that their object of research will be somewhat physically internalized and that their research will become a personal adventure. As a consequence, they can become personally affected by a scientific problem, which then becomes the problem of their life. Many scientists consider that the capacity to be personally affected by a problem is also important for discovery.

Another possible positive aspect is that, as a consequence of their high egos, scientists high in narcissism are often very sensitive, even to a degree of paranoia. They are good at elaborating a fiction about

themselves, and although this assumption is speculative, such a capacity could make narcissistic individuals more imaginative in their ways of finding solutions to a problem. In actual fact, one study explored the relationships between narcissism and creativity and found a small positive correlation between the two traits (Raskin, 1980). For instance, the study found that the most creative architects were more self-absorbed, had stronger ego autonomy, had greater independent thinking processes and tended to be more exploitive than less creative architects. The problem with this type of study is that the term 'most creative architects' could simply be translated into 'architects most effective in convincing others of their creativity'.

Other positive points of narcissism are an independence of mind and a lower level of inhibition. Like Niels Jerne, narcissists prefer to follow their own paths, and as a consequence, could be more prone to taking risky research directions, which diverge from the established trends in the field. This type of research driven by a sense of nonconformism can sometimes lead to unexpected discoveries. Finally, there are many traits associated with narcissism, which, when not too pronounced, favour good leadership. Narcissistic professors are good at transmitting passion to their laboratory members and giving their enterprise a high value, worthy of sacrifice.

Narcissism is not the only trait that prevails among scientists and this trait is not sufficient by itself to explain success in science. Anxiety[1] is also prevalent among scientists. Anxious people do not like to live in a variable and unpredictable environment. They want to control their surroundings, and, as a consequence, they want to understand. Thus, anxiety traits during childhood might later stimulate an interest for science that aims at providing a reliable vision of the surrounding world. Anxiety is also a kind of perpetual

1 Examples of signs of anxiety in science: the listener that answers the question before the end of the question, a difficult night before giving a seminar, the emotional output while preparing a grant proposal, speaking too quickly, jerkily or being too verbose.

anticipation of the future because anxious people are always analysing the consequence of an action. Similarly, a good scientist is someone who anticipates his field. This is the sort of body-knowledge that allows us to feel something, that tells us where we should go[2]. An anxious person will also be careful about all the parameters of an experiment and pay attention to the key controls.

But anxiety also has its negative aspects, such as the difficulty in enjoying the present while preoccupied with the future, and its treatment – working until exhaustion or, for many of my colleagues, climbing mountains or running marathons, where the physical exertion and tiredness frees their mind from this continual anticipation, allowing them to enjoy the present moment. This could explain the feeling of bliss after a long day of experiments, late in the almost-empty laboratory at night. A combination of anxiety and narcissism is probably at work, explaining the intellectual passion that animates the scientific quest. Narcissism can fuel passion and imagination, while anxiety provides anticipation and discipline. These are some ideas about how classic personality traits in humans could function in the framework of the scientific enterprise. Further work is required to better understand the relationships between characters and science. An interesting side-note along these lines – if narcissistic traits are prevalent among scientists, this could explain a certain bias in their vision and why they are often (at least the most narcissistic scientists) so condescending about their apparent objectivity when discussing other visions of the world, such as religion and other cultural frameworks (see Chapter 10).

2 The idea of the creative scientist's anticipation could be more complex than expected. Another scenario is that this capacity to anticipate simply reflects the fact that the science of the narcissistic professor is the science of the moment (for all the reasons discussed later). So when a narcissist moves to a new thematic, this motion moves the field with him, and then, he is acknowledged for his anticipation of the field. In this case, this is not anticipation. Narcissistic professors simply drive the field.

Narcissism and the assessment of a scientific statement

Judging the quality of a scientific article is a tacit act; it is more closely related to the judgment of a musical performance than to the correction of a maths exam. Narcissism is the most useful trait in the publication process, because narcissistic scientists have the capacity to transmit their feeling of self-importance through their writing and communication. They exude self-importance and this attaches itself to their actions. They use fashionable keywords and an introduction full of spin to reveal the importance of the study. Charming letters to editors, a pushy and self-convinced attitude and other implicit factors make them very efficient at passing the editorial bar of prominent journals for which they feel that they are naturally destined. Narcissism is linked to short-term seduction. This explains their intense passion for the story of the moment (and what appears to be their foresight, leading to a succession of big stories a few months later). It is possible that fields of research such as immunology, cancer and stem cells, which quantitatively dominate the scene, do so largely due to the presence of narcissistic professors that successfully convince others that it is they who are working on the critical questions, the important pathways and the master genes. It is therefore essential to explore how narcissism influences persuasion in science in a subtle way.

It is not easy to define what is important in science. According to Polanyi, a statement will be 'the more valuable to science the more it possesses i) certainty (accuracy), ii) systemic relevance (apply to many facts) and iii) intrinsic interest. The first two of these criteria are inherently scientific, the third one is extra-scientific' (Polanyi, 1962a, 136). None of these criteria can be applied as a rule to determine the pertinence of a scientific question. Instead, this is influenced by tacit judgment. Usually when we evaluate a field far from our own domain of expertise, we tend to monitor the orator's

ability to convince us rather than the intrinsic interest of the topic. Thus, the reason why a scientific community focuses its attention on certain specific questions cannot always be easily explained by those outside of this community.

How useful was it for Europe to spend billions at CERN in order to discover the existence or inexistence of neutrinos? Impossible to judge! The physicists certainly seem happy, but this could simply be a celebration of their own success (and their ability to waste money). We have to rely on the expertise of physicists, and we do it because we feel that they have been fairly reliable in the past. But in the end, we are usually influenced by the loudest and most political leaders of the community. Thus, how can a biologist distinguish between the programmes of two physicists, one a visionary bigmouth, good at convincing people, and the other who is not so talkative yet closely dedicated to experimental work?

Let's consider the attention given to the protein NF-κB. Around 235,000 papers mention the name of this transcription factor in their title! Billions of dollars have been invested in the search for a new anti-inflammatory drug targeting the NF-κB pathway, but with little success. Was this expense justified? Or, on the contrary, does the amount of NF-κB studies reflect a bloated field of research? The expansion of the field could largely be linked to the characters of the self-important professors who initiated the field, who in turn attracted similar types of researchers to join in, and succeeded in convincing everybody that NF-κB is a *very important* molecular pathway. How big would the NF-κB field have become if it had been discovered and explored by down-to-earth scientists working in second-grade universities? The hype would probably have been much lower. Would this have been a problem? And furthermore, were some more important pathways overlooked, for lack of self-confidence among their discoverers? Impossible to say now or to rewrite history! Scientists who work in these highly fashionable fields always manage to justify the existence of so many redundant papers.

Scientists high in narcissism, who consider themselves to be special, do not see the costs carried by the entire community. This explains why the presence of narcissists has such a great influence in defining the size of a field of research.

The question then is: How can we perceive what is important in science independently of personal factors? Polanyi considers that science should be seen as a system of beliefs because scientific knowledge is always *personal* knowledge, that is, knowledge contained by the knower with implicit premises that can never been fully defined. As a consequence, he proposes that each scientific statement '*p*', given by a scientist S should be preceded by a tacit '*I believe*'. This fiduciary modality indicates the personal and passionate engagement of the scientist toward their assertion (Polanyi, 1962a). I hypothesize that narcissistic personalities could have a great advantage in this tacit '*I believe*' because they appear more convincing. This would create a correlation between the 'importance of research' and the 'feeling of self-importance'. Narcissism is defined as an inflated self explaining this inflated '*I believe*'. This also reveals the underlying influence of a subjective quality – a personality trait – in a scientific judgment that we naively believe objective.

Following on from this idea, we can speculate that the judgment of an external person will be influenced by the sum of two elements: the statement *p* and the strength of the '*I believe*', which will be higher in a narcissistic scientist S. The strength of this '*I believe*' emanates from the narcissist's personal contact, style of their papers, elegance, powerful position and many implicit factors associated with dominance (See Box 3 below for an illustration in the managerial world). Over time, the influence of the strength of this tacit '*I believe*' might fade, allowing for a better evaluation of the second element *p*. The death of S could accelerate the depreciation of this tacit '*I believe*', except if perpetuated by a group of S's followers. This fits well with the (incorrect) idiotypic network theory of Jerne's that was convincing enough at the time to be taught in some universities, but then, step-

by-step, lost its credibility. This could explain why science looks so different when seen in the fever of the present moment or instead when analysed from an historical perspective, even just twenty years later. The work of many prominent figures of the past appears to be quite light when seen in view of today's knowledge. Narcissism is related to overestimation. Many intellectuals who occupied or currently occupy the media scene were extremely narcissistic, and it is probable that their ideas have been oversold. Similarly, the history of ideas shows us that many of our great philosophers were not fashionable in their time, while others, who appeared to be famous and occupied the media stage, have lost their glamour or it has been subsequently realized that they had largely recycled other people's ideas. It would be interesting to analyse the short and very long-term success of intellectuals and to try to correlate this with their characters. To sum up, narcissistic traits provide an advantage in science because they increase the persuasive power of the scientist.

There is most probably a specific advantage for narcissistic people to oversell their science outside their domain. They are usually good at churning out stellar papers or funding grant proposals that are impressive for outsiders, and which end up in the newspapers and help their narcissistic authors boost their career. Yet these pompous announcements often fail to satisfy close experts, who can better evaluate the substance behind the style. They can look behind the façade and see the short cuts and fancy wording. The academic peer review process is supposed to interfere here and prevent scientific overhype. However, because a narcissistic scientist will be much more convincing outside the circle of experts, towards the politicians and bureaucrats who decide on funding as well as towards the professional editors of generalist high impact journals, the latter can in turn act favourably when appointing and organizing a peer review. When the rest of us realize, ten years later, that these great studies and their promises were weak or incorrect, it is already too late.

This capacity to seduce outsiders already places narcissistic re-

searchers in a position of dominance in their scientific arena. Yet their seduction capacity could even be increased by the fact that journalists, politicians, and probably editors of generalist scientific journals are themselves high in narcissism, since obviously politics and professions with media exposure also attract narcissists (see Narcissism and fascination).

If the hypothesis is correct – that narcissistic scientists do have this capacity to oversell their science – then there are some very intriguing consequences. Let's now imagine, purely hypothetically, that a physiologist working on personality has discovered a simple biological read-out that correlates strongly with narcissism. An obvious one could be the level of a key hormone; for argument's sake, let it be testosterone. Several studies have indeed suggested a role for testosterone in increasing self-oriented behaviour and the motivation to dominate others (Wright et al., 2012). We could then try to modulate the importance of a submitted paper by knowing the biological testosterone read-outs of its authors. An editor might then say, 'Thank you for your manuscript, but my biological register indicates that you are high in testosterone. I have to take into serious consideration the likelihood that you have a high propensity to oversell your science and are probably a fame seeker. Consequently, there is a high risk that your paper is one of those "big stories with little substance and no follow-up". I will therefore have to look at your submitted paper with more scrutiny. Actually, I will pass it on for peer review to those of your colleagues who are especially meticulous.'

Box 3: Non-verbal cues influence the power to convince

In a recent Fedex commercial, a group of business types are sitting around a table discussing ways to save money. A midlevel corporate type suggests using Fedex. No one else at the table pays attention. Then the well-dressed boss at the head of the table say the exact same thing, but use his hands in a decisive chopping

> gesture. Everyone around the table then pipes up in agreement. When the employee who originally made the suggestion points out that he said it first, he is told he lacked the confident hand gesture. (Twenge and Campbell, 2009, 219).

This example, taken from the world of management, shows that many non-verbal cues influence the power to convince. The terms 'well-dressed', 'boss' and 'decisive chopping gesture' help us to understand why more attention is paid to the discourse. The tacit '*I believe*' is stronger. We can speculate that narcissist personalities have a stronger '*I believe*'. Although this observation is trivial, it can influence the way science is managed. An example is that of overconfident scientists that speak loudly with high-level language as exemplified by the case of the biologist Francis Crick.

Narcissists and their N-drives

According to the hypothesis raised above, narcissistic scientists will have a serious advantage because they are more convincing. Let's call the 'narcissistic drive' (N-drive[3]) the tacit convincing power

3 N-Drive: It could be conceived of as an ensemble of tacit and explicit factors linked to narcissism that often modulates the weight of a speech. These include non-verbal communication elements linked to high status (deep voice, a muscular shape, powerful gaze) and oratory and writing skills that maintain attention and other factors associated with narcissism (self-confidence, powerful situation, influential network, presence of a trophy partner). As we will see later, narcissism probably has a strong link with dominance traits, as described in studies of social hierarchy in primates and humans. It is easy to understand that the speech of a dominant person has more weight, especially to those sensitive to power and status. I speculate that the N-drive plays a key role in social interactions, including in the scientific community. The N-drive usually creates fascination and idealization (to get access to power) or hatred (attitude of someone who wants to take power). This explains how narcissists stay centre stage and are the object of complex discussions alternating between admiration and harsh criticism, depending on the point of view.

associated with narcissism. This narcissistic drive encompasses many elements that are both tacit and explicit: seduction, writing and oratory skills, network size, connection with politicians and journal editors, board memberships on journals and foundations, capacity for misconduct and unfair reviewing, personal wealth, presence of a trophy partner and a multitude of other factors that tell us that this person is important. Let's now define S-drive criteria: these are more related to the classic view of scientists: hard working, good memory, creativity, manual skills and dedication to the production of solid data. The overall value of a scientist could be defined by both their S-drives and their N-drives. The presence of a significant number of charlatans or impostors in science, often well-established but with poor real scientific achievement, suggest that a high N-drive can supplement to a significant extent a poor S-drive.

Let's now turn our attention back to the case of Niels Jerne. How can we evaluate his contribution to science? His idiotypic network theory was wrong; his selection theory was largely based on the work of others and could actually be judged redundant. He is credited for a number of peremptory statements, such as claiming that immunology has little to do with microbes and infectious diseases. Another immunologist, Jonathan Yewdell, seems to emit a negative judgment on the scientific contribution of Jerne referring in this context to the 'dark age' of immunology (Yewdell, 2003). And it is true that this type of personality might have delayed the integration of molecular biology and genetics into immunology, which later resulted in the blossoming of this discipline. But there is another point of view that could appear at first sight more cynical, which is to acknowledge that Niels Jerne was a great N-driver, by his charm, his self-centred personality and his capacity for seduction. Jerne was the type of personality who could integrate well with other self-assured and dominant James Watson-type scientists and important political leaders. Thus, he did in some way participate in the establishment of immunology as a major discipline that would later accumulate the

highest number of grants. The fact that his science is more or less correct is a minor detail; the key point was his power to convince others that the field of immunology is important compared to other fields, such as molecular biology and microbiology. It could be said, therefore, that it was a good thing to give the Nobel Prize to Jerne, even if some of his theories were largely incorrect!

A temptation among our meticulous scientists would be to expel all scientists with a high N/S-drive ratio and to dream of an ideal scientific community composed of scientists close to the bench. But this could pose a serious risk, at least in the present system, because there is the possibility that with the loss of these individuals high in N-drive, their areas of research would soon sink into financial neglect and oblivion because nobody would be advertising for them anymore. Indeed, whenever a prominent N-drive representative manages to secure another large chunk of funding for his new 'excellence network' or mega-project, many of his less significant colleagues genuinely rejoice and congratulate him. This reassures them that their field of research is indeed hot.

Narcissism is more apparent in hot fields because there is a causality link. This trait accentuates fashion in science. When a scientist with a high N-drive enters into a new field, there are two types of reactions from the classic members of this community. The first one is worry about the arrival of a powerful rival and a generally unfair competitor. The second one is more positive, because there is more chance that this neglected field will attract attention from the public and politics, receive more funding and acquire better access to high-ranking journals. Thus, N-drive really drives science by moving the spotlight onto specific fields. And now we can understand why some hot fields that attract scientists with high N-drive are so tolerant to papers whose bluster conceals incorrect data. This is good for the field!

An important point at this stage is that our analysis does not discard the idea that science has a link with an external reality,

that is, with an objective rationality. At the time of the AIDS pandemic, it was important to concentrate the effort of the scientific community on the HIV virus. This was not just fashionable. But at the same time, other implicit factors enter into the game and this 'rational adventure' is transformed into a 'human adventure' in which personality and tacit interactions play a key role. For instance, certain members of this large community could make unreliable statements insufficiently supported by scientific evidence, with dangerous medical consequences, simply because they could not resist being in the spotlight. This forces other scientists to react and engage themselves to counteract, a delicate situation when we know the real nature of scientific facts. When Polanyi spoke of *personal* knowledge, he wanted to emphasize that pure objectivity does not exist, but this does not mean that science is pure subjectivity. His theory of knowledge transcends the objectivity/subjectivity distinction by recognizing a personal coefficient. Thus, although narcissism subtly influences the way we evaluate science, this does not entirely eliminate classic rational evaluation. The inflated bubble created by narcissism ends up deflating, but often only much later.

Thinking about narcissism in this way raises other questions. Can we imagine a world in which the subtle influence of narcissism does not enter into consideration? Is narcissism an unavoidable consequence of our animal heritage?

Narcissism and fascination

We are told that the fashion designer Yves Saint Laurent was the one who enabled women 'to discover their own femininity'. We all know that Louis XIV 'built' the castle of Versailles. In the same way, there is an idealization of narcissistic scientists and of their achievements by others, notably those who have the same character. This idealization reaches its zenith once a scientist reaches the status of great savant, for example, after winning the Nobel Prize. Each sentence previously

uttered is now seen as a premonitory statement, similar to that of religious prophets.

The idealization probably usually occurs between a professor and his protégé. There is no doubt that microbiologist and Nobel Prize winner François Jacob did some great work on the lactose operon providing a model of gene regulation. In an epitaph, one of his former pupils underlined the creativity and anticipatory capability of Jacob who started to use mice to study animal embryonic development in the late 1960s, pointing out that mice are now the models of choice for scientists studying human diseases (Morange, 2013). But in fact, this statement is probably exaggerated because the decision to use mice as a model for developmental biology in the late 1960s was not such a good idea, since at that time there was no possibility for in-depth genetic studies in mice. In fact the history of science has shown that simpler model organisms such as the fruit fly *Drosophila* and the nematode *Caenorhabditis* were better for paving the way in the molecular dissection of fundamental developmental processes; the successful use of mice came much later. Nevertheless, when high-calibre savants make what could be considered an error, they are still right and are even said to have anticipated the field!

Let's come back to the immunologist Jerne and analyse the fascination he created around him. One of his supporters was asked 'Why do you think the Stockholm Committee included Jerne in the 1984 Nobel Prize?' His answer was simple, 'Without Jerne, there would have been no theories about antibody diversity, no Basel Institute for Immunology, no education of Köhler, no antibody-forming B-cell assay, no Milstein seminar' (Alkan, 2004). Jerne has been called 'one of the most intelligent biologists of this century', 'a Leuwenhoek in theoretical biology', 'a living legend' and a 'dominant figure'. Anne Marie Moulin, a historian of immunology, speaks of Jerne's (incorrect) idiotypic theory as a 'Copernican revolution' (Söderqvist, 2002, 2003, xvi, 273). This is quite surprising when we know that most of his theories (when rigorously analysed) were quite

imprecise. Though he might be considered an above-average and possibly great scientist, Niels Jerne's achievements, even the faulty ones, have become greatly overrated by colleagues and journalists.

We could talk endlessly about Niels Jerne because of his high N-drive that created fascination, or indeed about Freud or any other great savant that inspires passionate responses. But some of these passionate responses can be excessive – they take centre stage in any discussion of the person in question, preventing even healthy questioning and criticism. Sometimes we need to arrange a honourable way out for believers, letting the strength of their passion decline over time before reviewing the actual influence and import of the great figure. My feeling is, however, that there are many more interesting scientists that have published solid and precise results and that do not needlessly fill scientific legacy with their inflated self! But it has to be admitted that these scientists do not fascinate.

From this, we can draw two conclusions. The first is that narcissists create fascination around them and that this fascination is not just caused by their effective achievements – from the collective work of a multitude of scientists, the narcissist emerges as a unique legendary figure. The second one is that people higher in narcissism tend to be more fascinated by narcissists. Similar types of idealization are probably at work to explain the fascination created around rock stars, dictators or even some saints of the Catholic Church. An argument supporting our statement that people high in narcissism tend to be more fascinated by narcissists is the observation that European teenagers show a great fascination for high N-drive heroes such as the South American revolutionary Che Guevara, self-centred rock guitarists and star soccer players. Passion for Che Guevara is less frequently observed in older men and rarely observed in women. As narcissism peaks at adolescence and is slightly higher in males than females, this provides an argument supporting our hypothesis that the level of narcissism influences and probably increases the fascination for people with a high N-drive. In their book *The*

Narcissism Epidemic, Twenge and Campbell attribute the raise of narcissism in US society to several causes, one of them being the cult of celebrities. They write, 'Americans get obsessed by people obsessed by themselves' (Twenge and Campbell, 2009, 90). My interpretation would be that this cult of celebrity is a secondary consequence of a rise of narcissism in the US population rather than a causal factor (although the cult of celebrity could reinforce the trait).

How can we explain the fascination exerted by narcissists over other narcissists? We have seen earlier that narcissists use other individuals as a self-enhancement strategy and are interested in relationships that bring them personal benefit. We have also seen that the N-drive correlates with power and high status. Thus, scientists high in narcissism will unconsciously tend to take into consideration the N-drive of other scientists (rather than only their S-drive). When dealing with a high N-drive counterpart, a narcissistic scientist will strive to profit from his influence over his scientific field, his access to good journals and his network of 'excellent people'. A scientist with a low N-drive such as our meticulous scientist will be less interested in high N-drive, because he is less interested by his personal achievement compared to the success of the overall community. He could even minimize the importance of his field of research.

By idealizing someone within one's own field of research, this accords value to one's own self and work. Nevertheless, a scientist high in narcissism can sometimes idealize a scientist low in narcissism if there is a direct benefit. Let's imagine a meticulous scientist with a low N-drive working on field A, who has been acknowledged for his discovery. Let's now imagine that scientists working in field B perform the subsequent steps of the discovery. A scientist with a high N-drive working in field A will value this first scientist because his discovery provides a direct value to his own field compared to field B. This explains the complex competition between members of different communities that underlies the attribution of Prizes, because these honours tend to influence the allocation of resources to given fields.

It cannot be excluded that the fascination exerted by people high in narcissism is not only dependent on a direct benefit at the present time. It could also be an old relic from our evolutionary history (for example, for gaining the favour of a dominant person, see later) that still functions in contemporary human personalities. In this case, a significant part of the fascination for N-drive could be seen as a cognitive bias associated with social dominance in humans, similar to the cognitive ability that establishes hierarchy organization in primate society.

Box 4: Speculations on the N-drive of the psychoanalyst Jacques Lacan

Apologies to the reader for introducing yet another French intellectual to visualize the N-drive. One could be forgiven for thinking that the N-drive is, like Napoleon, a French national treasure!
Jacques Lacan was a prominent French psychoanalyst. A good exercise in the context of this essay is to watch excerpts of his conference (with English subtitles) given at the University of Leuven in 1972. This allows us to visualize the N-drive element as well as other elements of non-verbal communication.
`https://www.youtube.com/watch?v=5MlxLMNRLbA` (Google the words: youtube, Jacques Lacan, Université catholique de Louvain. The video must be 59′49″ long).

The viewer should not miss these cues (time indicated in brackets):

- Lacan entering the amphitheatre while smoking a cigar, his face full of self-satisfaction (0′35″–1′00″)
- His unique style: attire, dominant attitude
- The light substance behind his talk (from 4′40″ – stop whenever you want). His unusual slow speech could convey a feeling of profundity and could be seen as a way to capture attention

- The apparition of a vehement revolutionary student: Did this student try to look more dominant with his extended gestures and verbalization? (from 21′35″–26′00″)?
- The Lacan way of answering a simple question (32′55″–35′10″). His two-minute answer, largely free of any informative content, is reproduced below (without Lacan's silence). This allows us to analyse the substance behind the style.

What is psychoanalysis? Lacan answers,

> Psychoanalysis is something whose existence is beginning to be recognized by many people. And I certainly didn't invent the experience of analysis. It developed along certain paths, which were not always in line with the eventual aim. However, there were certain forms in which it became established. While the forms are obviously artificial, as in every kind of experience, they have allowed a certain elucidation about something, which cannot be called disturbances or discontents. What is highly significant is obviously what results from the analysis itself. At this point, the fact that a growing number of people are aware of the possibilities of such an experience is the basis upon which I believe I have something to say.

Some have claimed that Lacan was just a charlatan, others that he was a deep thinker. Elements of this video suggest that he has an outstanding N-drive; the question we are left with is what is the real substance behind his show? These types of inflated-self personalities also have inflated bibliographical impact (the size of Lacan's Wikipedia entry is similar to Darwin's, 2015). Lacan has been the subject of multiple theses and occupies a central role in the French intellectual landscape, being one of its legendary figures.

At this point, I wish to underline that the contribution of N-drive to recognition should not be underestimated. It brings a spark of uniqueness to an otherwise normal moment; it transforms the tasting of a reasonable wine into a memorable experience; it creates attention and respect towards a professor in the amphitheatre. It also induces fascination and polarizes certain types of personalities.

Although the precise contribution of Lacan is a matter of debate, he has clearly contributed to intellectual business, by giving a pre-eminence to the field of psychoanalysis among other psychology approaches, increasing the activity of editors and booksellers, and by creating positions and studies in various universities. Some of his successors, though, have possibly provided a more precise contribution.
While the seminar given by Lacan is testimony to a period of history and is removed from science today, it is nevertheless not too different from when extremely self-confident biologists oversell their science to convince politicians and financiers to invest in their mega-projects. It cannot be excluded that the inflated bubble of interest will actually end up creating something interesting, at least indirectly. Thus, the strategy can work out, although it becomes a problem when everybody follows the same trend for overselling.

Narcissistic strategies for achieving fame in science

Keywords and special language

There are hundreds of thousands if not millions of scientists in the world. Yet among them, few will become famous during their lifetime and among those few, even more rare are those whose legacy will be retained by posterity. Narcissism is associated with a desire for fame and to be admired. We will now explore some of the tacit strategies that narcissists use to become famous in science.

In the classic perception of science, scientists make discoveries that change the views of the world, and then they try to convince others that these findings are universal. In the case of an important discovery, the scientist is seen as a visionary; he has crossed a 'logical gap'. He might have to find new words and expressions to depict the reality that has been transformed by his new concept. Thus, the use

of keywords could be positively viewed as revealing a new reality. In this essay, we have stated that the inflated use of catchy keywords, an emphasis on style rather than content and a reconstruction that masks triviality (spin) are assets for narcissists to capture attention. A scientist or a philosopher can become well known through a keyword. Popper gained glory from the keyword 'falsification', Polanyi from 'tacit knowledge'. Freud succeeded in being associated with the broad term 'unconscious' and the classic 'Freudian slip'. Another way of getting fame is to attach a name to a law. Physics and chemistry are famously full of laws, units and reactions carrying the name of a scientist. There are also many examples in biology such as the Hayflick limit, which refers to the number of divisions an untransformed cell can make, the Krebs cycle in biochemistry or the Mendel laws in genetics. To maximize their fame, narcissistic scientists should try to attach their own name to a keyword, a law or a molecule, as this is the best way to be referenced in articles, textbooks and to discreetly link the scientist to his scientific object. Failing this, one can at least try to create a memorable term or acronym.

But we can go further; philosophers, notably of the French tradition, use not only keywords but specific and complex language. The meaning of their books is difficult to grasp, especially for non-specialists, yet these philosophers retain their fan club of experts. These experts are often also high in narcissism (see self-fascination) and are proud of their special aptitude because only they are capable of understanding the deep thinker and accessing his hidden wisdom. Narcissism is intimately linked to specialness. We can hypothesize that this special style and wording largely reflects the narcissism of the thinker. He no longer wants to use a common language, but rather, from his perceived superior position, he expects others to enter into his unique way of thinking. Because of his high ego, he behaves like a king on his throne, where visitors must come to him and not the reverse. Thus, the inflated use of keywords and specialness in their style might be a sign of highly narcissistic intellectuals

(see Figure 6). This is a strategy to dominate the field, mask triviality and emerge above the contribution of others. To survive, keywords should capture an aspect of reality, but should also be ambiguous. More than that, these keywords should be designed to seduce the public rather than actually describing reality. They should have the power to attract other narcissists. If this notion is correct, we can understand why disciplines such as immunology (in the past) or Freudian psychoanalysis, both having a complex terminology, tend to attract and be perpetuated by people high in narcissism.

Narcissism is sometimes described as an increased dependence towards others, because narcissists seek approval and admiration. It cannot be excluded that this dependence means that narcissists are less capable of sticking to reality, as the public actually expects an unrealistically extraordinary performance from them. Thus, overuse of keywords and specific languages denotes more an unconscious will to impress or to please the public than to describe reality. It is interesting to note that many fields of research become misled by the inflation of keyword and names, which only reflected the fashion of the time.

Mythic moments of discovery

A good way for successful scientists to become even more memorable and famous is to make their personal lives and the private background of their discoveries mythical as well. Examples are aplenty, and sometimes the myth has little to do with truth. Galileo, bravely fighting the obscurantism of the Catholic Church, is a much-appealing figure for scientists. The legend of Dmitri Mendeleev, dreaming up the periodic table of chemical elements in his sleep, shows that great thinkers are often perceived as visionary sages or even prophets. But also the personal eccentricities of scientists are subjects of great interest – the more bizarre their quirks, the more cherished these anecdotes will become. Students love to hear the story of the immunologist Ilya

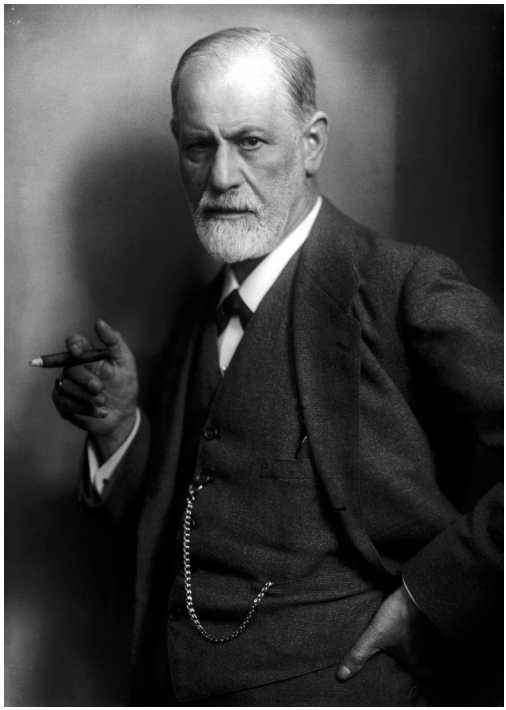


Figure 6: Sigmund Freud and his keywords

Footballers change haircuts at half-time during matches. Rock stars announce their final tour every year. Celebrities cry, divorce and get married again, while politicians continue introducing reforms with an increase in rules and regulations. Depending on their field, people high in narcissism have their own way of getting attention. To attain fame, the best strategy for scientists is to put their name to keywords, a scientific law or to become legends. Just think of Archimedes' 'Eureka!' in his bath or the fall of Newton's apple. Sigmund Freud, for example, achieved incredible notoriety by being associated with the term 'unconscious'. He also created new jargon containing many keywords, many of which have entered the public domain (for example, libido, id, ego, superego, repression, sublimation, oral stage, anal stage, phallic stage, latency stage, genital stage, Oedipal conflict and Electra complex). Freud's work has been recently re-evaluated quite harshly. It cannot be excluded that his excessive notoriety masked the works of deeper and less visible psychologists. In his critical essay, Tallis described Freud in terms that evoke high narcissism (Tallis, 1996). Credit: Freud by Max Halberstadt (CC)

Metchnikoff, who was so depressed that he tried to infect himself with pathogens or the tale of the evolutionist George Price, who gave away all his possessions simply to contradict genetic selfishness. Inflated self, the desire to impress, a sense of specialness; all these traits make narcissists incredibly good at making, often involuntarily, their life mythic. Here we will explore the 'Eureka!' or 'Ah ha!' moments that mark the illumination of the discovery by the savant.

The bulk of scientific discoveries are made by scientists in their laboratories, while doing experiments or analysing results, when reading or writing scientific papers, when discussing with colleagues or when listening to talks at meeting. But this pedestrian approach does not apply to narcissistic scientists who are expected to leave a special mark on their discovery. Therefore, a classic (and most of the time, unconscious) strategy to link oneself to a field of research is to turn the discovery into a magic moment. A first consequence is to unambiguously give credit to a single individual by indicating a T_0 time point of the discovery. In addition, its magical circumstances are sometimes themselves a way to reach fame. Archimedes achieved celebrity by his mythic 'Eureka' in his bath. The fall of the apple participated in the legend of Newton. Friedrich Kekulé is famous for having a dream of a snake seizing its own tail before discovering the ring shape of the benzene molecule! This type of story creates fascination and facilitates entry into textbooks.

Box 5 shows five examples of discoveries in the field of molecular life sciences. The key points to note are that these descriptions obey a certain logic: i) they first take place at an unexpected moment revealing the obsessive nature of the discoverer, ii) they do not acknowledge any filiation to other scientists, iii) they are far from the bench, and sometimes iv) they evoke a courageous combat.

The observation that both Niels Jerne and Robert Weinberg (examples 1 and 2) made their discovery when crossing a bridge could suggest that bridges are hot spots for having a revelation or a visionary idea! A simple explanation is that this staging echoes the crossing of

a logical gap. The discovery of François Jacob in the movie theatre (example 3) implicitly underlines to others that in Paris, scientists also have a cultural life. We could oppose it to the Californian style (example 4), as exemplified by Kary Mullis with his girlfriend in the car (maybe they were returning from a windsurfing session). Closer to the laboratory is the discovery of the molecular nature of the LPS receptor (TLR4) by Bruce Beutler who describes the *'Hillary step'* with unique precision: 'The defining moment came at 9:30 pm on September 5, 1998.' An analysis of his long article reveals a discovery with a winner-takes-all attitude – a series of struggles against adverse conditions (Beutler and Poltorak, 2000). Another symptomatic 'Eureka' moment is the one that takes place in a plane at the airport, on the way to an important commission meeting (example 5). The plane signals that the protagonist is important and literally above those pipetting in the labs and the lightning storm echoes his obsessive and difficult quest, marked with a sudden illumination.

Box 5: Five examples of magic moments of discoveries

1. Discovery of the selection theory by Niels Jerne on a bridge in March 1954 (Holmes, 2004, 181; Söderqvist, 2003)

> The train of thought went like this: the only property that all antigens share is that they can attach to the combining site of appropriate antibody molecules ... [and] a selective mechanism for promoting the synthesis of those antibody molecules that make the best fit to any antigen entering the animal. The framework of the theory was complete before I had crossed the Knippel bridge.

2. Discovery of cancer genes by Robert Weinberg (Angier, 1988, 73–4)

> One February morning in 1978, Bob Weinberg had no choice. He had to walk from his home, then on Beacon Hill, to his lab at the Cancer Center, a mile away. The night before, a record blizzard had muffled the entire Boston area. Perhaps subliminally aware, as he trudged across the Longfellow walkway, of the symbolic significance of bridges, Bob Weinberg had an idea.

> 'It was an idea of numerology', he said 'I thought about the sensitivity of the transfection technique and about the fact that we could detect the presence of one sarcoma virus amidst roughly a million fold excess of unrelated DNA sequence. The DNA of a single sarcoma virus was all what we needed to produce a focus of transformed cells.'

3. François Jacob's discovery in the cinema (Zimmer, 2013; Cobb, M., 2015, 158)

> One day in July 1958, François Jacob squirmed in a Paris movie theatre. His wife, Lise, could tell that an idea was struggling to come out. The two of them walked out of the theatre and headed for home. 'I think I've just thought up something important,' François said to Lise. 'Tell!' she said. Her husband believed, as he later wrote, that he had reached 'the very essence of things'. He had gotten a glimpse of how genes work together to make life possible.

4. The discovery of PCR in the car by Kary Mullis (from his website)

> They were heady times. Biotechnology was in flower and one spring night while the California buckeyes were also in flower I came across the polymerase chain reaction. I was driving with Jennifer Barnett to a cabin I had been building in northern California. She and I had worked and lived together for two years. She was an inspiration to me during that time as only a woman with brains, in the bloom of her womanhood, can be. That morning she had no idea what had just happened. I had an inkling. It was the first day of the rest of my life.

5. The use of worms to fight off autoimmunity by Joel Stock (Stock, 2012).

> This question was plaguing me as I sat in a plane on the runway of Chicago's O'Hare airport for five hours one day during the mid-1990s. I was on my way to a grant-review session for the Crohn's and Colitis Foundation of America when lightning struck the control tower, forcing us to wait until the airport could get up and running again ... That brainstorm in the middle of a lightning storm has turned into an active area of research.

Perhaps the funniest thing is the discrepancy between the eureka moment which takes place far from the lab environment and the propensity of some of these great savants to rapidly slip on their lab coat and adopt the appropriate pose as soon as journalists approach the laboratory. The photographic staging of the great savant at the bench in the heat of the moment or playing with a model of molecules is another way to gain entry to textbooks. This ability to switch roles and assume the appropriate behaviour to capture maximum attention is a way for narcissists to be recognized. There is no difficulty for individuals who intimately believe that they are *special* to adopt the right attitude that helps them be remembered for posterity.

In fact, careful analysis reveals that many of these moments of revelation do not match reality. Frederic Holmes has interesting reflections on this in his book *Investigation Pathways* where, step by step, he follows the work of twelve scientists by carefully analysing their laboratory books (Holmes, 2004). He reveals the complexity of the path to discovery and demonstrates that the discovery story of some great savants does not fit the reality of their lab books. Of note, science historian Michel Morange who carefully analysed the career of his former mentor (never having believed in François Jacob's movie story) and suggested a more reasonable scenario (Morange, 2003).

The interesting point here is to see how the staging of the discovery captures the narcissist personality so well: the inflated self that creates the myth, the feeling of specialness with the absence of any affiliation with normal scientists, and the 'I', centre stage in combat against adversity. In the three following quotes on Niels Jerne, his biographer Thomas Söderqvist clearly captures the appropriation of discoveries by the immunologist high in narcissism (Söderqvist, 2003).

> In fact, Jerne's discovery of the dilution effect [one of his first discoveries – BL] made so great an impression on him that he long chose to overlook the fact that it was already known in the serological literature [. . .] Objectively, he may only have

> repeated what others had already found out. But subjectively, he experienced it as his own discovery. (94)
>
> In our discussion, Jerne admitted that he consciously antedated the event in the Festschrift article [his major discovery on selection theory of the immune system – BL] so that no one would suspect that he had been inspired by Delbrück, or anybody else at Caltech, and hence he might not have been the sole and independent constructor of the selection theory. (171)
>
> After Jerne's theory was published, in November 1955, assertions came from several quarters that he had only resurrected Ehrlich's theory, an allegation against which Jerne reacted stiffly . . . The episode suggests that he was a strong scientist who expressed anxiety over being under the influence of another thinker, that he wanted to be unique, that he opted for originality rather than displaying his connectedness with tradition. (178–9)

Occupation of the media scene

These stories of discovery refer to a romantic view of science and could appear outdated compared to the science of today. It is actually expected that scientists and their perceptions should change to fit the standards of the moment. They took place at a time when professors were viewed as intellectuals or deep thinkers. Many of my professors who were used to being on stage had a certain dominant attitude in their way of walking and of looking at people, and in the deepness of their vibrant voice. For instance, a glance from beneath drooped eyelids created an attitude of superiority and a sense of profundity. In my youth and as a male student high in narcissism, I was sometimes fascinated by these men of gravitas. Observations of my notes a few weeks later, however, often revealed that the content of the course was quite poor and disorganized. It was as if the purpose of the

course was for us to idolize the professor rather than to convey the content understandably.

Note that some of us could be nostalgic for this period, simply because the way narcissism runs science today is so crude. The quantity of money injected into science and the development of new modes of communication have changed the deal, and scientists are no longer reluctant to appear glamorous and be present throughout the media (Figure 7). To reach the status of discoverer, scientists have to occupy the media arena by accepting all meeting invitations – in large part to enhance visibility and prevent the arrival of competitors. They also have to establish close connections with important members of the community and the media world.

Already in the 1940s, Waksman was travelling around the world to present his discovery of streptomycin, presenting himself as a generous and modest benefactor of humanity, resulting in him been seen as the sole discoverer of the drug. When the contribution of his student Schatz was recognized a few decades later, Schatz conceded to a journalist that his main surprise was that nobody had ever asked him how the discovery of streptomycin was really made. The scientific community was interested in the spectacle with the figure of the great savant, not the reality in the laboratory. This narcissistic attitude is still the style of science that the lay public, journalists or even historians appreciate. It is the one that helps sell books and attract attention.

Impact of N-drive on recognition

Many scientists, especially the meticulous ones, hesitate to use the term *genius*, except when speaking about distant individuals in the past, outside their own field. Individuals high in narcissism would feel more at ease with this notion of genius, because of their feeling of specialness. It is time to analyse how narcissism, and notably the N-drive, influences recognition in science.

Figure 7: Strategic occupation of the media scene

In recent years, following a movement initiated in the US, scientists are no longer shy of appearing in the media. The image above is a screen shot from a web video about one of the discoverers of the CRISPR genome editing method, Feng Zhang. Although sidelined from the Google and Facebook founders' Breakthrough Prize, he is still in the running for the Nobel Prize. Visibility, strategic occupation of the media scene and networking are essential in the process of recognition. In the associated text, the journalist describes Zhang with a quasi-mythic tone.
The CRISPR, one of the most recent breakthrough discoveries in life sciences, is the object of intense lobbying to decipher who are its true discoverers, and CRISPR itself is the object of a patent conflict. The vision of science as being created by heroes prevails, masking the contribution of the community and more discreet actors. The 'spectacle' draws attention away from the reality of the laboratory. Video and text can be found at: `http://www.statnews.com/2015/11/06/hollywood-inspired-scientist-rewrite-code-life/`.

We could speculate that in order to be recognized as a great savant one would require a high N-drive on top of a high S-drive. The N-drive would create the necessary attention and fascination, especially to the most narcissistic scientists who generally hold positions of power and influence. When a scientist with a low-N drive is acknowledged for a discovery, he is considered to be lucky because he was in

the right place at the right time. He might also be recognized for his 'technological' contribution to the field. In sharp contrast, when a scientist with a high N-drive makes a discovery, he is recognized for his 'conceptual' contribution, often with the extra dimensions of a 'breakthrough' or of 'breaching a dogma'. This could explain why important discoveries often seem to come from nowhere, because they have been made by people exploring unknown areas, unfashionable before being captured by a scientist high in narcissism, who is listened to by others. The narcissistic scientist can then exclusively revel in the importance of the discovery, playing the role of the intermediate with sometimes the unfortunate consequence of downplaying or even denying the status of discoverer to their modest colleagues with low N-drives. A well described example was the initial surprise and doubts that accompanied the discovery of the DNA genetic code by two outsiders, Marshall Nirenberg and Heinrich Matthaei, as everybody had expected that this major discovery would be made by one of the dominant figures of molecular biology such as Crick, Jacob, Monod or Sydney Brenner. At that time, certain scientists dismissed the contributions of Nirenberg and Matthaei, stating that 'the experiment was rather obvious' or that the 'whole thing has happened more or less by accident'. Fortunately, the already famous Francis Crick could play the role of an intermediate underlining the importance of their work to the community (Cobb, 2015, 173–95). In the same vein, I could find no 'Eureka' story written by a woman (although I did not try hard). This could be due to the small sample bias but also to the fact that women are less inclined or capable of mythologizing their lives.

Indeed, an interesting aspect of narcissism is how this trait varies inside a population and possibly between human populations. In a more or less homogeneous population, the tacit '*I believe*' could be of the same strength, and people belonging to this community could easily estimate p. But, the existence of differences in the level

of narcissism between human populations[4] could create situations in which certain individuals, due to their ethnicity, have higher or lower powers to convince. From my own referential (a European scientist*),* it is extremely difficult to find Japanese heroic figures in science in which we can project ourselves or that we could consider as being genius. Until recently, East Asians tended to score low on the narcissism scale and may have more difficulty linking their self to their discovery, which results in a lower recognition of their contribution. Nevertheless, Japan ranks first in terms of patents and dominates many applied fields, which constitutes concrete evidence of high creativity. My essay raises the hypothesis that their relative lack of awards or heroic scientific figures recognized by Westerners as genius could be linked to a lower N-drive. Along these lines, many Westerners enjoy visiting Japan and have sometimes the feeling of being overvalued by their overtly kind hosts. Visiting Japan is good for feeding the ego of male Westerners! During an Asian meeting, a reputed Japanese professor, Yash Hiromi, gave an insightful talk, where he encouraged his Japanese colleagues to use humour effectively in their speeches as a way of appearing more convincing. Stage performance with a low N-drive remains a challenge!

Many of our great thinkers, Galileo, Karl Marx, or Sigmund Freud, have reached dominant positions in the Western intellectual landscape and have been followed by a phenomenal number of subsequent studies. This could be due to the high N-drive of these intellectuals with their capacity to tacitly fascinate other intellectuals. Even the figure of Albert Einstein and the status he attained, exemplifying the genius, is intriguing. Some physicists consider Max Planck with his quanta theory to be more revolutionary or that the

4 We could use the term basal narcissism to refer to average healthy narcissism levels in a population. Basal narcissism could be defined as the mean level of narcissism observed using the standard mode of parenting in a population today. Both genetic predisposition and environmental factors (notably parenting) determine the variability inside each population.

mathematician Henri Poincaré was philosophically deeper. The way Einstein posed with his haircuts, plus a number of myths associated with his life have probably played an important role in his status of genius of the century. For example, as a teenager, I was fascinated by the image of the young Einstein spending three days contemplating a compass, and other mythical features associated with his life.

Narcissism is linked to overevaluation and short-term seduction. For instance, there are more and more voices criticizing the influence of Freud, noting that it has resulted from excessive fascination (Tallis, 1996). Thus, it cannot be excluded that the fascination for Freud and his complex language actually held up the field of psychology, or masked other deeper thinkers. If this is true, the fault should not be attributed to Freud himself but to the idealization and blindness of his followers who were influenced by his N-drive. Along these lines, it might be interesting to compare the long-term development of fields of research that are dominated by a prominent figure and others resulting from the collective endeavour of many scientists. It is possible in the second case that the continual self-adjustment imposed by the existence of the various protagonists could lead to a scientific model that is closer to reality.

How can we test the relationship between narcissism and inflated reputation? Retrospective analysis could be used to assess the personality of a scientist and try to decipher his real contribution inside the community. Narcissism can be retrospectively assessed using a number of elements. For instance, scientists high in narcissism will favour their career over their family life and will be less involved in child rearing. Thus, a prediction is that scientists higher in narcissism will tend to break their family bonds more frequently than others, especially when they no longer constrain themselves to any religious or social expectations. Another way would be to compare the size of Wikipedia biographies as a proxy of inflated self, as narcissists are better at making their lives mythical, marrying and having affairs with famous people and linking the discovery to their personal history.

But, this essay also suggests how a combination of different personalities could actually create synergy, instead of competition. A careful meticulous scientist with a low N-drive would be more successful as part of a team with a good storyteller, but only if the second refrained from taking all the credit and was aware of his self-serving bias tendency. The first could have a more accurate view of reality, while the second could better carry the message to the scientific community and the public.

Chapter 7

Network, Mafia and the Pipeline of Recruitment

Networking is a passkey word these days in life sciences. It has become so popular that it is recommended in a course supported by European Molecular Biology Organization (EMBO). This key European research organization therefore seems to support the notion that unless you are good at networking, there is no place for you in science. This is actually largely true, but not necessarily a good thing. The problem is that the ability to network (which is different from being able to collaborate or to communicate) is primarily a consequence of a self-centred personality. Narcissists use human relationships as a self-enhancement strategy. Social personality experts report that narcissists 'socialize selectively'; 'they know the "right" people', 'they associate with the most important and popular people' and 'they attend certain social events where certain "key" people will be' (Buss and Chiodo, 1991).

It is now time to explore why, because of this networking ability, narcissism is so tremendously important for succeeding in science.

Networks and narcissism

> Friendship is fundamental to close collaboration between scientists, 'certainly you have to be personal friends' as Francis Crick says. (Söderqvist, 2003, 113)

The quote above illustrates a general observation in science. The most successful scientists often mix their private life and their career – their friends are usually their colleagues working in the same field. This selective socialization has some benefits by reinforcing the obsessional nature of the scientific inquiry. Many scientists would agree that the paths to discoveries are usually the endeavour of two to three scientists, excited by the same question and working hard together to find a solution, as illustrated by the Watson-Crick duo. Actually, such partnerships can be among the best moments in a scientist's professional life, when an experimental observation is followed by incessant and passionate discussions followed by further experiments to test these new ideas.

It is expected that in this type of group interaction, narcissists will tend to use others as a self-enhancement strategy. Scientists high in narcissism are by nature inclined to claim credit for the discovery, transforming the collective adventure into a more personal one. To summarise, narcissists naturally absorb and successfully communicate the discovery as exclusively their own. And because of their N-drive, other scientists will follow their cue by idealizing them. The history of science overflows with examples in which one individual, usually the professor, takes all the credit, as exemplified by the initial ignorance of the role played by the PhD student Albert Schatz in the discovery of streptomycin or of Charles Best in the discovery of insulin (Lawrence, 2002). Unremarkably, it is often women scientists that are pushed aside and whose achievements are misappropriated by their male colleagues, as exemplified by Marthe Gautier's role in the discovery of the cause of Down's syndrome, initially credited to Jérôme Lejeune (Gautier, 2009) or Rosalind Franklin's famous X-ray

data on DNA structure that was passed on by her male colleague to James Watson, behind her back (see other examples in Lawton and Webb, 2014).

Networking does not refer to human relationships within the laboratory but rather to friendships with useful colleagues within the scientific community. Let's explore this important facet of science activity. Young narcissistic professors expend much energy travelling and building a network, even at the start of their career when a naive view of science would recommend that they concentrate their energy on their own research in their own lab. In fact, visiting important colleagues and creating intimate relationships with some of them can have a tremendous impact on a career. Every occasion, be it faculty meetings, conference trips, private discussions in fancy restaurants and hotel bars, is used to curry favour with those important narcissistic colleagues who dominate the field. Invitations to meetings and seminars usually obey the logic of tit-for-tat. You are invited to give a seminar and few weeks later you are contacted by a journal editor inviting you to review a paper authored by your kind host. The investment of a seminar invitation to a potential peer reviewer, including comfortable travel, fancy hotel and a fine dinner, is laughable compared to the gain in grant funding when the paper is accepted, thanks to a favourable review. Personal contacts with editors of prominent journals or members of editorial boards are also critical for the successful publication of a paper. Special relationships with editors explain why many scientists tend to publish their big stories in the same journal. This explains what we noted above, that the optimal situation for a laboratory is to be led by a scientist high in narcissism, who spends his time in travel and email. Networking is nowadays illustrated by the complexity of science organizations with multiple affiliations, the famous network of excellence of the so-called leading laboratories or top universities. In some cases, fields of research are dominated by a group of interconnected scientists, sometimes from the same ethnic origin, for the simple reason that

common language and ancestry make it very easy to establish mutually supportive networks. Therefore these business-like friendships of fellow countrymen are sometimes labelled, only half-ironically, as mafia.

One key element to success in a field like molecular medicine is to publish one or two papers in trophy journals and to be personally recognized by your peers, notably the most powerful ones. In an open system like science, each scientist is supposed to apply the same rules as the others. Yet if a group of scientists is part of a network with mutual benefits, they will prevail over those meticulous scientists who only collaborate in a purely scientific sense.

Networking has an effect on access to high impact journals in three ways. First, networking provides confidential information on the progress of the field, allowing, for instance, a narcissist scientist to adjust the timing and the content of a publication. Second, a publication has a better chance of being accepted when reviewed by a 'friend' (who will later expect a return favour). Third, editors, like all humans, are sensitive to mass-action. Editors listen carefully to the judgment of those who are themselves successful in publishing in trophy journals like *Nature* or *Science*. Thus, high-level publishing becomes a self-augmenting feedback loop; your next paper has higher chances of being positively reviewed and accepted because you have already published successfully before. In turn, your own expert recommendations regarding your colleagues gain more traction with editors, as your own publication list grows. Also, high-level publishing attracts other narcissistic people, thus the field begins to be considered as important.

James Watson cruelly remarked that a scientist is someone who has his paper published in *Nature* (Söderqvist, 2003, 140). This is mostly because publishing in *Nature* is often the sign that you have entered into a network of important people. It does not to take long to observe that access to top journals is not distributed uniformly among fields and largely reflects the presence of narcissistic individuals.

Thus, the optimum situation for a scientist is the *realpolitik* of science. Publicly one proclaims the objectivity of science and the ethic of the scientific enterprise, while building and maintaining obscure tit-for-tat relationships with influential 'friends'. Networking is the way to receive from the community what would be seen impolite to take or demand by oneself: 'I'll write your Wikipedia biography, and you write mine', 'I'll help you to get this prize, and you help me to get this position.' This is, of course, seldom referred to out loud, but the same logic takes place on the panel of grant offices where the most strategic members of the scientific community feature, such as the European Research Council. The end result is that the rich laboratories get richer under the appearance of fairness.

Social personality researchers have noticed that individuals with narcissistic-like traits tend to hold network positions that afford them the greatest control over the network (Clifton, 2011). It is important here to realize that what we call here 'network' is not a structured or conscious organization but the consequence of a selective mode of relationship.

Nepotism is directly related to networking and can also be used as a proxy of narcissism. By placing close persons – friends, loyal lab members, sexual partners and even one's own family members – into more traditional academic structures and key positions, the narcissistic professor increases his stranglehold on the community, emerging as the leader. Network and nepotism allow access to community resources while maintaining the outward appearance of honesty and integrity. Networking requires the skills to correctly identify the appropriate partners to enlist into a tit-for-tat relationship. It is at this stage that narcissistic scientists display a fascination towards other narcissistic people. As we have seen earlier, from a narcissistic viewpoint, to be an 'intelligent scientist' is to be a 'narcissistic scientist' with an emphasis on the charm, the style, the impression, in essence, the ability to transmit one's inflated self. These effects implicitly participate in a strategy of domination and success at the expense of

the community and in some ways could be seen as a certain form of intelligence or a social skill. In contrast, a scientist low in narcissism like our meticulous scientist will be intimidated or even repelled by a famous, powerful and arrogant colleague. Because of his integrity, he will avoid being obsequious with a politically minded scientist or investing time and effort into strategically useful relationships.

Thus, these networks are not an overt strategy but rather a consequence of the narcissistic character and feedback mechanisms to enhance the self. Scientists differ in their networking ability, and this is also likely to reflect their degree of narcissism.

Leadership in science and narcissism: A pipeline of recruitment

> Narcissistic personalities ... are frequently encountered in top management positions. Indeed it is only to be expected that many narcissistic people, with their need for power, prestige and glamour, eventually end up seeking leadership positions. Their sense of drama, their ability to manipulate others, their knack for establishing quick, superficial relationships serve them as well. (Kets de Vries and Miller, 1984, 32, quoted in Campbell et al., 2011)

The link between narcissism and leadership has been extensively documented in social-personality literature. Narcissistic people are often found in leadership positions in companies, the army and politics. As put by Campbell (2011), 'there is evidence that the pipeline to modern organizations further perpetuates the emergence of narcissistic organizational leaders' (Campbell et al., 2011). Scientists high in narcissism are also found at the head of non-profit laboratories and universities, where they might not necessarily be expected. Apparently, the pipeline of recruitment in science also favours the emergence of narcissistic leaders. To succeed in science is

to first find a good laboratory. A naive view of science might imagine that the main criteria for choosing a good laboratory is the topic of research, the cleverness of the professor, the positive interaction between lab members, the passion inside the lab; in short, the vibrant intellectual atmosphere in the laboratory and in the university. For a purely research-minded graduate student, this approach is probably the best.

For a primarily career-focused young scientist, however, a much more important factor is the level of the professor's narcissism and the networking value of the institute, which in turn will play a key role in the student's own access to critical members of the scientific community. In addition, professors high in narcissism are usually better at promoting their favourite students as a self-enhancement strategy. These professors are easily identified through their publication lists, which mirror their fast-track access to high profile journals. Narcissistic students are *naturally* attracted to this type of laboratory because they see science as a collection of trophies and achievements, admired by the community. Knowledge is viewed as a succession of breakthrough discoveries published in top journals, such as *Science*, *Cell* and *Nature*. The prestige of having published an article in these journals counts for much more than the actual content, quality or even reliability of the study. A succession of steps in just a few laboratories allows a scientist to be acquainted with the most important leaders of his field.

On a much more obvious level, scientists high in narcissism also have strong advantages in a job interview. First, they are good at selling their science and finding the appropriate words to fit the expectation of the recruitment panel. We have seen earlier that narcissists have this capacity to please, because of their higher dependence on the other. Second, recruitment panels are generally numerically or hierarchically dominated by narcissists. Narcissists are by essence strategic operators; therefore participation in recruitment panels is a way to set up alliances and to reinforce their own position

inside a faculty. Self-confidence and a natural inclination towards ranking people or things, two features associated with narcissism (and, as with narcissism, are usually more prevalent in males than females), are often viewed as assets in evaluation activities. As for the scientific evaluation of the candidate's achievements, a narcissistic commission member will fully trust himself to judge far outside his own actual area of expertise. After all, having a greatly inflated opinion of one's own knowledge and capacities for understanding is also one of the key features of a narcissistic mind. In contrast, a meticulous scientist will feel uncomfortable in evaluating grants or individuals outside his limited domain of expertise. In recruitment panels, narcissistic candidates will tacitly benefit from jury members of the same personality because of their capacity to induce self-fascination as explained earlier.

Some questions like 'What is your strategic vision in the next ten years?' or 'Where would you like your name to appear in ten years time?' are typical questions raised by panel members with high levels of narcissism. Narcissists do much better when answering this type of question than meticulous scientists, who feel uncomfortable. This creates a pipeline of recruitment in which people high in narcissism tend to favour scientists with the same type of phenotype. And then upon engagement, they congratulate the new faculty member, with whom they have established a new link of dependence.

Let's imagine a faculty directed by scientists high in narcissism. In recruitment, they favour the hiring of a valued colleague's protégé or an already established collaborator, thus reinforcing their dominant positions and preventing the arrival of future competitors. The self-enhancement module subjectively portrays the appropriate candidate as bright and as filling a gap in the faculty. However, a scientist too bright or too overtly successful could overshadow the current leadership. He would then be found by the influential members of the committee to be 'a bit weird', 'working on an old-fashioned thematic' or 'good, but not really fitting the bill'. Candidates have

to be aligned with the self-enhancement strategy of the established leadership. We can conclude that, as observed in the managerial world, recruitment pipelines tend to maintain scientists high in narcissism at the top level of science.

Influence of the N-drive on gender equality in science

In this context, many gender equality issues in science are probably related to narcissism. Women tend to score lower on the narcissistic scale than men, although this may be less true for female leaders in today's United States. Our essay recognizes that some traits associated with narcissism (passion, capacity to cultivate one's own difference, self-absorption, lack of empathy, etc.) do have a positive influence on science and could explain differences in success. Nevertheless, the subtle influence of N-drive on recognition increases the prejudice bias against ambitious women as well as a certain type of scientist such as our meticulous scientist. Narcissism seems to be a critical trait for rising to the top of the academic environment's hierarchy, because it brings the power of persuasion, the skill of appearing smart and efficient (at least in the eyes of the narcissists in charge) and it also brings visibility and power from its network. Women are left with few options. Those sufficiently high in self-confidence and ambition can succeed, but unfortunately these are not yet the qualities traditional men respect in female colleagues. Narcissism does not favour a peaceful family life, thus placing women at a strong disadvantage against men. One route to success for women scientists is to create an alliance with a male colleague, because this type of arrangement boosts the network ability of the couple. Otherwise, it means finding the rare pearl, a very accommodating partner, who accepts all these extra-scientific activities so important to success. Among the ten Nobel Prize female winners in biology, five did not have a child, and

among the other five (with either one or two children), four had a partner in science. This suggests that in the absence of an alliance (a partner working in science), there is a trade off between scientific achievement and family life. The situation today is probably more favourable though.

It is important to understand that the influence of the N-drive is not expected to be identical throughout different research areas, as narcissists are predominantly attracted to fields of research with more money, more media exposure and the possibility of achieving fame. Medicine deserves a special mention in this line. Medical careers are very attractive to individuals high in narcissism because of the higher source income, the special status and a title, and because this type of job provides a relationship with patients based on admiration and dominance. This could explain why research organization in hospitals is so hierarchical and complicated, often affected by quarrels among professors to maintain power within their territories (rooms, patients, specialties). All the energy lost in such a struggle for power is quite regrettable. A lecture on the narcissistic personality and the influence of a situation of power on behaviour could be beneficial to students embarking on a medical career.

Chapter 8

Misconduct and Low Communal Investment

Over the past few years, political and financial arenas have steadily revealed whole series of scandals and murky situations. It is striking to see that even in well-established democracies, the number of scandals remains surprisingly high, despite the fact that most politicians do not need to struggle for survival. Why would relatively rich people pervert the law? Probably because they have fewer ethical barriers, as they are set up to believe that they are *special*. A link between narcissism on the one hand and corruption and incivility on the other has been suggested. To cite Campbell:

> A clear picture is beginning to emerge that narcissism primarily impedes organizational functioning through its association with increased unethical behaviour and decreased organizational citizenship behaviour (OCB[1]).
> (Campbell et al., 2011)

There are two reasons why science, notably hot fields of research, does not escape this scourge. First, science attracts a certain type

1 OCBs are empirically distinct from task performance, encompassing behaviours that facilitate organizational functioning without directly contributing to the technical core and are not necessarily rewarded by formal reward systems.

of narcissist drawn by the chance of fame. Second, there is very little control of unethical behaviour because science is viewed as an objective and rational activity.

Narcissists often accommodate reality to their own interests

Recent years have seen a notable increase in the retraction of published scientific papers in life sciences. All these retractions are just the visible tip of a huge hidden iceberg. In many fields, incorrect papers are never retracted or flagged with an expression of concern or a correction. Wrong or approximate papers are largely the consequence of extreme self-confidence, hyperfocalization and an inability to stay in the shadows: traits that are associated with narcissism. When you have a feeling of self-importance, you are more willing to adapt reality to your needs. A prominent scientist high in narcissism moving to a new field might not be diligent or humble enough when learning the standards of this new field, simply because of his high standing and his sense that he should be able to publish quickly. It is also logical to expect that scientists high in narcissism will tend to (often unconsciously) publish a 'pushy' paper at key steps of their career. They will inevitably make the necessary great discovery in order to obtain the position they feel they deserve.

In France, we call an incorrect paper a *casserole* (cooking pot). It is the custom to attach a string of pots behind the car of young married couples. The noise as they drive off attracts everyone's attention to the newlyweds. Usually, these pots are rapidly lost on the road, falling off as the strings break. Incorrect or 'pushy' papers play the same role: they attract attention at a key moment in a career; they are a kind of 'get-a-job/get-a-grant' paper. But then memory in the science world is short, especially in hot fields where the rapid accumulation of papers makes it impossible to assess their solidity,

and the *casserole* is soon forgotten. An easy way to recognize many of these papers retrospectively is that they generally tell a big story but without any real follow-up (that is, except in access to funding grants). Officially, the paper was so seminal and influential that the professor no longer felt any need to continue working on that topic. This has nothing to do with a series of papers that is self-correcting in the traditional manner and that characterizes honest and meticulous scientific activity.

Narcissism is associated with risky behaviour, which can brutally put a stop to a rapid career ascension, as is often illustrated by politicians and business leaders. Narcissistic managers are prone to take risky decisions that can sink the company because they overestimate their own capacity to succeed, while underestimating the risk. Note, however, that often in real life, the cleverest narcissists leave the boat just before it sinks, pocketing the money while leaving their successors to deal with the damage they have left behind. In the scientific arena, corrupt narcissistic leaders are also protected by their colleagues, who are afraid that with the revelation of the wrongdoing the entire faculty could collapse, burying everything, including themselves.

Some psychologists see narcissism as a personality with a bias for detecting positive signals (glory, success) while being less sensitive to negative signals (cost, risk). This is in line with psychological constructs that see narcissists as approach-oriented: exhibiting a strong approach motivation coupled with weak avoidance motivation (Foster and Brennan, 2011). In psychology, approach behaviour is motivated by and towards good things and avoidance behaviour is directed away from bad things. Or put simply by Foster and Brennan, 'narcissists made riskier investment decisions, not necessarily because they failed to appreciate the risk associated with their decision, but rather because the lure of the big money payout was irresistible' (Foster and Brennan, 2011). In this line, narcissistic scientists seem to neglect the warning signals that indicate a weakness or a trivial

interpretation of the dataset, because they are so much more attracted to the fanciness of the final story, the furore it will make among their colleagues and media and, last but not least, their personal benefit in terms of promotion.

Finally, narcissistic, well-reputed professors usually do not care much if their pushy claims cannot be subsequently reproduced elsewhere. In science, publications are not always carefully read and often have a value in the number of times they are cited, based on their title alone. Through this malpractice, an utterly unreliable paper can easily gather hundreds of citations, which seemingly support its findings. Some even continue being cited after they have been retracted. In a way, it is the privilege of the smartest top scientists to publish a *casserole* in high profile journals so that their meticulous colleagues will then busy themselves with discussing and trying to reproduce the data, while losing a tremendous amount of time. This demonstrates implicitly their power and how they are respected. Of course, not all wrong and 'pushy' papers can be linked to narcissism. Incompetence, absence of supervision and uncritical deference of a student to a professor – all these can be involved in the production of poor quality articles. But the narcissistic personality trait is nonetheless often associated with misconduct (see Figure 8).

Moreover, a good narcissist tends to excel in sexy ¾-right papers rather than completely wrong ones, because they are almost impossible to debunk. Actually, the fake ¼ is the sexy bit that gets the story into *Nature* and *Cell*. In fact, most scientists have grudgingly learned to accept this and to sort between the hot air and the solid science of a given publication. The problems begin only when the hot air becomes prevalent. This was stated in a clear way by Michael Polanyi in his 1946 book *Science, Faith and Society*:

> The quickest impression on the scientific world may be made not by publishing the whole truth and nothing but the truth, but rather by serving an interesting and plausible story composed of parts of the truth with a little straight invention

> admixed to it. Such a composition is judiciously guarded by interspersed ambiguities, will be extremely difficult to controvert, and in a field in which experiments are laborious or intrinsically difficult to reproduce may stand for years unchallenged. A considerable reputation can be built and a very comfortable university post be gained before this kind of swindle transpires – if it ever does. If each scientist set to work every morning with the intention of doing the best bit of safe charlatanry, which would just help him into a good post, there would soon exist no effective standards by which such deception could be detected. A community of scientists in which each would act only with an eye to please scientific opinion would find no scientific opinion to please. Only if scientists remain loyal to scientific ideals rather than try to achieve success with their fellow scientists can they form a community, which will uphold these ideals.
> (Polanyi, 1964, 53–4)

This text clearly synthesizes the danger of the accumulation of 'pushy' papers in high impact journals; the whole system starts to lose its credibility. What Polanyi does not capture here is that this type of behaviour is not always conscious, but rather the consequence of a personality trait.

It is of course important to specify that not all scientists high in narcissism will cross the border into misconduct. Some of them will invest all their energy into making the best dataset and the most precise interpretations. They might be overselling their story but will not breach ethical integrity. It is probable that the ethical values and standards that a scientist imposes on himself can counterbalance the narcissistic drive to succeed. In science, active experimental work usually has the beneficial effect of counteracting the expression of narcissistic traits. As such, scientists who remain close to the laboratory also know the standards of their field better and are less prone to unfounded exaggeration. Nevertheless, the ultracompetitive nature of science, together with a society devoted to the cult of

Figure 8: Narcissism is associated with fame and misconduct

A 5-metre tall bronze statue celebrating Zidane's head-butt during the 2006 football World Cup final against Italy. This head-butt allowed Zidane to attain greater fame, but probably destabilized the French team, which subsequently lost the decisive match. It was clearly done at the expense of his teammates, whose names have been forgotten. Narcissists are vulnerable to ego threats and criticism. This might explain why Zidane overreacted to the recurrent insults from the Italian player. Someone with a lower ego would have been less sensitive to insults and would not have felt important enough to endanger the whole team. In all fairness, the stressful conditions of a high-level football match make self-control much more difficult to maintain. What would happen though if all football players behaved like Zidane? When asking this question the most common answer is 'Of course, it would be a problem, but Zidane was *special*.'

The situation is not particularly different in science. Some highly reputed professors have no problem not following the law. And once again, the answer is that they are *special*. But what would happen if everybody did the same thing? Studies on social dominance suggest the existence of cognitive biases, which make us more tolerant to misconduct by people of higher rank. Credit: (CC) Pic by Mohan; Doha Stadium Plus Qatar.

success and celebrities have probably loosened this brake on ethical approaches to research.

The strategy of narcissists in academia is to get the best head-start possible, which often means publishing one or two *casseroles* in high profile journals at an early stage of their career, possibly even with an honest intent to then produce exclusively serious and conscientious work once the *casserole* has allowed them to attract tenure, funding and staff. This explanation would fit the narcissistic feeling of entitlement, which makes it acceptable to occasionally break the law to get them what they rightfully deserve. The near-complete absence of retrospective analysis in the assessment of science makes this strategy viable. A continuous production of *casseroles* is risky but still possible as long as retractions do not accumulate beyond a certain threshold. This usually requires a rapid change to a new field before the issue can be detected. The career of this type of professor would appear as a long succession of 'big stories with no follow-up' and slick presentations.

Conflict of interest and narcissism

Narcissism is associated with many other types of misconducts. If we consider science to be an open and fair system then, ideally, each scientist should apply the same rules of fair play to all the other members of their community. The reality shows that this is very difficult, since we never treat someone we know, or who has been positive towards us, in the same way as an unknown person. An ideal scientist should have two separate minds when reviewing or entering into relationships, with professional friendships, competitions and other conflicts of interest taken into consideration if this separation is not possible. But there never seems to be a conflict of interest if we are set up to feel we are special. Specialness implies special treatment. This is why it is still considered to be in good faith when narcissistic professors abuse confidential information, delay the publication of

a paper from a competing laboratory or promote their loyal friends through inappropriate channels. Instead of the sense of conspiring expressed in, 'I will positively review this paper from Albert, who has been so positive for my career', the narcissistic psychological module translates into, 'This paper is so amazing! Albert, what a genius! This paper must be published in *Nature*'. The lack of transparency in most scientific evaluations provides a huge advantage for scientists who are high in narcissism compared to scientists with a broader sense of community. This creates a real dilemma, because scientists who stress openness and generosity and who take into consideration the community concerned with each of their actions cannot compete with those who do not. We have the paradoxical situation in which the organization of science hinders generosity and a sense of community and favours personal achievement. Collegial generosity and collaboration are integral parts of science, but they are often misappropriated to feed the careers of scruple-free narcissists, who are skilled at exploiting any environment for their own advantage. This is only possible because the degree of narcissism varies significantly between individual scientists, modulating their behaviour. If all scientists had the same (healthy) level of narcissism, they could actually peacefully and productively interact and the implicit rules of science would be followed to the same extent.

Indeed, some might wonder how, despite the high level of narcissism prevalent in science, the system is still working. This can be explained by at least three observations. First, every idolized professor is counterbalanced by numerous meticulous scientists both inside and outside the laboratory. Second, narcissism peaks in young age, when professors need to find their place, and decreases later in age. Once the critical period is over, they have plenty of time to become ethical. Third, narcissistic professors are usually reasonably fair and less tolerant towards bad science outside their own field, where there are no risks from competition. It is only around themselves that they discreetly maintain a scorched earth policy so that nobody else can

prosper. The real problems come with the increasing frequency of this type of attitude and the growing resignation among meticulous scientists that there is no alternative to participating in this increasingly questionable race.

Narcissism and the tragedy of the commons

High profile scientists, be they grand mandarin or Harvard operator, are charismatic leaders who offer their teams all the advantages of their characters – self-serving bias, the network, the self-confidence that makes their own science seem so important, good connections with editors and the capacity to ruthlessly appropriate resources without much concern for their surroundings. Therefore, charismatic leaders are usually good for their laboratories and the reputation of their universities, but they are a nuisance at the community level, because they burn up resources, often for self-promotion and public relations. Thus, a striking feature of narcissism is that it brings personal advantage with a high cost for the community, making it similar in this regard to corruption.

This is one of the paradoxes of narcissism, well illustrated by a parable extracted from an insightful review on narcissism in organizational systems by Campbell et al. (2011):

> Imagine four corporations that are each in the timber business. They are able to harvest timber from a renewable forest, but if they overharvest, the forest will be destroyed. Now, a narcissistic corporate leader in this situation will harvest more than other leaders. Thus, the narcissistic leader will win initially. However, this acquisitive behaviour will cause all the other leaders to start harvesting more rapidly. As a result, the forest will be destroyed – the narcissistic leader will do better than the others, but all will ultimately suffer.

Narcissism leads to the emergence of charismatic leaders, but at the expense of the community. As put by Campbell,

> Narcissistic leadership resulted in short-term performance greater than direct competitors. However – and this is the big catch – the more narcissistic the corporate leaders that were competing with each other, the less well each – and all – did . . . Much of the current destruction in the financial and real estate industry, for example, have the appearance of narcissistic damage at a meta-organizational level.

As pointed out by Campbell, organizations (in this essay, universities and research institutes) function in an environment with other organizations. While these organizations may be seen as competitors, a healthy economic landscape is necessary for all organizations to survive. In this broader economic landscape, narcissism can lead organizations to short-term victories that are ultimately disastrous.

This damage at the meta-organizational level illustrates a contemporary trend where the presence of charismatic leaders high in narcissism is increasing at the same time as many citizens are experiencing a decrease in their quality of life. But this damage at the meta-organizational level also affects science in many ways. We have already mentioned how the mandarin system that prevailed in many European countries was good at generating a few local visible scientific stars while preventing the emergence of a real mid-level class of talented scientists, because it rewarded loyalty and networking, instead of objective scientific performance. Following the US model, universities are now engaged in a competitive race with an obsession for ranking, where communication and public relations become the crux of the matter. This rush pushes scientists to breach ethical barriers to get access to high-impact journals and funding with dramatic consequences. Along the same lines, visionary scientists with salesman skills oversell their science to the public, creating expectations that cannot be met. Additionally, universities now employ journalists and science writers for their self-promotion, in order to disseminate the biased view of science of their paymasters. This is regrettable because a better diffusion of scientific knowledge would

require a critical and independent journalistic expertise. Eventually scientists will be surprised to see society's scepticism towards science and lament how science has declined in attractiveness for prospective students. It will not take long to detect the link between this increase in narcissism in our society and a concomitant decrease in trust. Finally, the excessive emphasis on translational or applied research is damaging for global creativity. By dismissing basic research as irrelevant, certain countries want to get the benefits of science without carrying the cost, engaging themselves in a short-term vision. The problem is that if everybody follows the same trends, the result will be a general impoverishment for all. Thus, scientific enterprise might not escape this dangerous spiral of damage at the meta-organizational level. Meticulous and less communicative scientists could one day pay the price for the risky behaviour of others.

Chapter 9

The Dilemma of the Meticulous Scientist

We have analysed some of the advantages that the narcissistic character may have conferred to science. Let's now, though, come back to the situation of our low-profile (idealized) meticulous scientist in science today. How can he compete? This type enjoys science for the sake of experimenting, testing hypotheses and making discoveries. Financial gain and institutional power are all rather secondary to him; his true reward is the daily intellectual challenge. This scientist is keen to collaborate scientifically, but is not particularly interested in networking and attending all those artificial and boring strategic meetings. He does not feel fascinated by the high-ranking people he meets, aside from their supposedly great discoveries. He has too great a sense of community and feels guilty when he uses too many resources. He cannot compete because he does not have the competitive character! He is not even good at promoting his own students, despite his best intentions – think of all the benefits for a junior researcher who joins a laboratory led by a narcissistic professor. Narcissistic scientists are better at promoting young scientists and they can be acknowledged for that, but we should be aware that this happens at the expense of the community. If a professor remains honest in his scientific papers and grant assessments, and does not network sufficiently, then he will disadvantage his own students and

postdocs compared to a narcissistic colleague. In science, not only will the meticulous scientist lag behind in the race, but additionally he will be accused of not promoting the younger members of his laboratory. And if he starts to complain against the system, he will be accused of being too negative and of scaring young students away from science. This is the dictatorship of positivity that allows narcissistic professors to dominate the scene. Why are we so hard on doped sportsmen yet so tolerant with scientific leaders who do not respect basic ethical rules? As a consequence, many clever, curious and hard-working students with a great sense of community experience disenchantment and are burdened with negative career consequences.

The importance of meticulous scientists

The meticulous scientist may never become competitive compared to his narcissistic colleague, simply because he does not have the optimum self-centred character. Yet without meticulous scientists, science would rapidly cease to exist and turn into quackery and showcase projects.

Narcissistic professors always need people who actually carry out the hard task of scientific research. Yet they are careful not to unduly reward them and to maintain their potential internal competitors in a state where they do not pose a risk. Eventually, a particularly distinguished meticulous employee may be awarded a professorial position or a major start-up grant, but this will happen only when there is no risk of overshadowing the narcissist.

Narcissists usually emerge as leaders but there is a frequency effect. If all scientists started behaving like high-profile super-charismatic leaders, the system would collapse through overpredation. Narcissists excel when surrounded by low-profile scientists. So our meticulous scientist is probably more important for his narcissist colleagues, who are prisoners of their self-enhancement strategies, than they are

for him! Our meticulous scientist's life could be even more enjoyable, as he could appreciate the beauty of the scientific enterprise without needing to be at the centre of attention. The only problem is that the presence of meticulous scientists is today in peril due to the increase of narcissism and competitiveness in our society and widespread disappointment in science and its loss of values. This is bad news for our meticulous scientists, but it could eventually trigger the fall of our charismatic leaders. Science can only sustain itself as long as there are enough young idealistic students entering and enough meticulous scientists retaining at least their mid-level positions in research.

Overtly narcissistic scientists are not even the best leaders. Studies in the private sector do not provide any striking evidence that narcissistic managers do better than the others. They take more risks for sure. Some psychologists speculate that they might do better in emergency conditions, but this is unclear. As stated by Twenge and Campbell (2009),

> Narcissism is a great predictor of imaginary success – but not of actual success ... There is one exception to the rule that narcissism doesn't lead to success. Narcissists are good at individual – though not necessarily group – public performance. When narcissists can receive public recognition and admiration for their performance, they try harder and do better. (43, 47)

This suggests that narcissism may influence the motivation to succeed, and this could play a role in scientific fields where public recognition is important. But that's all. It is noted that in the company world the best leaders are 'not the charismatic, ultra-confident figures you would expect. Instead, they are humble, avoid the limelight, never rest on their laurels, and continuously try to prove themselves' (Twenge and Campbell, 2009, 44). This implicitly tells us that scientists high in narcissism are incredibly good at tacitly convincing everyone else how talented they are. Thus, narcissistic scientists are

usually especially good at performing at the last minute, at waving a trophy in front of the public, at appearing in the spotlight in scientific textbooks and at seeming indispensable. They collect prizes and honours, fill science academies and display inflated Wikipedia biographies, but it is possible that their absence would not even be noticed in the long run.

Finally, this essay provides information as to why individuals with a strong desire to dominate, rather than to achieve productive results, are found in leadership positions. We could even imagine specific training, which would transform a meticulous scientific into a star. The meticulous scientist would be taught that he should first of all appear confident, as confidence signals competence to others. He should make himself visible to the community by attending special events, and he should selectively socialize with the most influential members of different communities. He should be skilful at using the buzzwords of the moment and giving slick presentations that please his audience. He should be self-centred and spend time only on activities that lead to personal reward and have strategic value. He should avoid communal duties, which would immediately depreciate his value. He should instinctively promote only colleagues that reinforce his own position, while depreciating potential competitors. As noticed by the science sociologist Robert Merton, important professors publish little, reserving their energy for 'important things' (Merton, 1968). Thus, a laboratory with only a few selectively favoured projects and employees, and where most of the other PhD students and postdocs remain desperate and without publications, tends to increase the value of the professor in his community.

This message will certainly induce a feeling of sadness, but it reflects a certain reality in the scientific world. It also echoes the sentiments of students I have met, quite often good, meticulous scientists themselves, who abruptly left their laboratory forever, with mixed feelings and disillusionment. I want to emphasize that the aim

of this essay is by no means to denigrate the beauty of science and the richness of the scientific community. Science is by far not the worst place to be. It is rather about underlining that it cannot avoid being tainted by human affairs. Of course, my secret hope is to help correct some of the negative aspects that have become more prevalent these days.

Chapter 10

Speculative Note: Is Self-Analysis Possible for the Narcissistic Scientist?

How do narcissists perceive themselves and can they become nicer? Studies done in psychology suggest that personality traits are stable over time and difficult to change. An issue with narcissists is that they are not usually willing to change. Why would they change given that they perceive themselves as smarter than others? Indeed, they often suffer less from their personality than their entourage. Interestingly, however, one study points out that narcissists are not completely blind about themselves and can have insights about the negative aspects of their personality (Carlson et al., 2011), for instance, describing themselves as arrogant and realizing that the positive impression they make on others usually deteriorates over time.

Scientists are expected to have a sharp, self-critical mind, and should be able to realize the influence of their personality on their attitude. To close this Part II on personalities in science and open the topic more broadly, I will speculate on whether a self-analysis of the scientific community is possible. This is a way of leading into some fascination questions about our cognitive bias. For this, I will now imagine a reputed scientist working on evolutionary biology, for

whom a succession of events in his life (e.g., he has just abandoned his family to start a new life with a fresh postdoc) has opened his eyes and made him realize that he probably scores highly on the narcissism scale. Below could be some of his thoughts.

He will first think about his vocation and his attraction to evolutionary biology, realizing that this was maybe a path for getting fame and attention. There are several points that make evolutionary biology an attractive field for narcissistic scientists, notably access to the media as this field remains the focus of public interest, in particular due to the clash with creationists. Evolutionary biology is also a field sensitive to wording and slick presentations, which could attract a showman. In fact, some prominent evolutionary biologists have been described as quite arrogant and self-confident (Trivers, 2015).

Let's accept this simplistic hypothesis and imagine the consequences if this field of research tended to attract people higher on the narcissism scale. Given the traits associated with this personality – the 'high outside magnification, low inside resolution' that allows them to pinpoint the faults in others and that gives them the capacity to slightly depreciate others and the desire for fame – a conflict like creationism is beneficial to narcissistic scientists. It gives value to their field and is a source of attention. It is much easier kicking in open doors and bravely fighting fundamentalist misconceptions than combatting the cult of celebrities or the rise of inequalities. If this hypothesis is correct, it would be better to avoid calling on prominent figures in evolutionary biology to resolve issues with creationism and religion. Choosing a colleague low in narcissism (easy to find among women or East Asian evolutionary scientists) could be a better choice for preventing unnecessary conflict of interest.

Another question is how his scientific vision of the world could be influenced by his degree of narcissism. We have seen earlier that scientists tend to project their own vision of the world onto their science. Narcissist scientists are elitist by essence and enjoy competitive activities with the need to dominate the other rather than

to get along. This raises the question of whether the current success of evolutionary Darwinism and its position as a meta-theory does not rather reflect the fact that we, at least Westerners, are becoming more and more narcissistic. Sociologists have suggested a parallel between the development of Darwinism and liberalism or individualism during the 19th and 20th centuries. We could go further and suggest a similarity between the success of Darwinism and a change in our personality. Concepts such as competition, fitness and survival of the best fit so well with the academic environment, and increasingly with our society in general. We could rephrase the famous quote of the geneticist Theodosius Dobzhansky, 'Nothing in biology makes sense except in the light of evolution' by the credo of the narcissistic person, 'Nothing makes sense outside of myself.' This idea could explain why few female scientists seem to have marked this field, and why a neutral theory of evolution came from Motoo Kimura, a Japanese leader originating from a more communal type of society. For many years, nature has been seen as a source of harmony rather than as a source of conflict. According to this hypothesis, our view of the surrounding world could partially echo our personalities. But how could we test this hypothesis? It might be possible to compare levels of narcissism by carrying out psychological tests on biologists and see if it correlates with strong Darwinian approbation. Or we could simply wait one or two centuries to see how our vision of nature has changed. Would future historians characterize our period as high in narcissism?

But let's now explore another intriguing aspect of the complex influences of personality on science. Altruism and cooperation are two features that characterize human society. Experts on evolutionary biology use the terms 'free riders' or 'cheaters' to define non-cooperative members of a community whose actions benefit themselves with no gain for the community. In the real world, narcissism is a much richer concept that underlies many deleterious human behaviours from simple corruption to tyranny. Why? Because

narcissism refers to a personality type and not to an individual's behaviour. Personalities as exemplified by narcissism are influenced by parenting, and the behaviours resulting from a personality largely depend on the overall framework of value of our society. Thus, the behaviour associated with narcissism is not a property of an individual but could rather be considered as emergent properties that integrate individual temperament, parenting and societal framework. A construct like narcissism allows us to understand why criminality is often associated with poor parenting conditions and is much more frequent in countries with an unequal repartition of wealth. Let's be reductionist in our approach and imagine, if only for the sake of argument, that we could identify molecular markers (gene variants, hormonal levels) associated with narcissistic traits. So what would happen if successful scientists realized that they have higher levels of these markers compared to the average population? Should they keep this information for themselves? Or should they rather inform the lay public that they are no longer able to be trusted?

Finally, let's imagine a scientist who wants to study narcissism in a scientific context. Narcissism is a variable trait among humans. We all tend to see the world through our own personality. We are usually good at detecting narcissistic traits in people who are higher on the narcissism scale than ourselves, while we tend to find those who compared to ourselves are lower in narcissism dull, passive or unambitious. Thus ideally, studying narcissism in science would require someone low in narcissism to be capable of detecting this trait. But this raises many issues. Such people are, in essence, very empathic; they will spend their time taking care of others, their relatives, friends and partners and will hardly find the time to focus on their own research. In addition, they will want to avoid hurting their colleagues with their critical conclusions. More than that, they will not be convincing at all because they will be too open, too honest, and too critical of themselves and their research! As they possess a low force of conviction, nobody will listen to them! Their talks

will not be exciting and catchy enough! Maybe a frustrated narcissist who did not achieve his expectations or a vulnerable narcissist would be in a better position to study narcissism in science. This reveals a real issue in the current combat against the rise of narcissism in our society – the fact that scientists, artists, journalists and, more globally, intellectuals, who form the classic vector of discussion and agitation in the media, are usually not the best suited for this combat.

This provocative section illustrates some fascinating questions about personality and science: how our objective vision of the world is framed by our personality. How could this vision change as our personality changes? Could the high narcissism that prevails among prominent scientists explain some of their errors, for instance, their tendency to dismiss other visions of the world without realizing how arbitrary their point of view is? How can this be corrected? And finally, how can we study a trait that has so much influence on the way we do and sell science? These are open questions for the future.

Part III

The Developmental and Evolutionary Roots of Narcissism

Chapter 11

The Developmental Roots of Narcissism

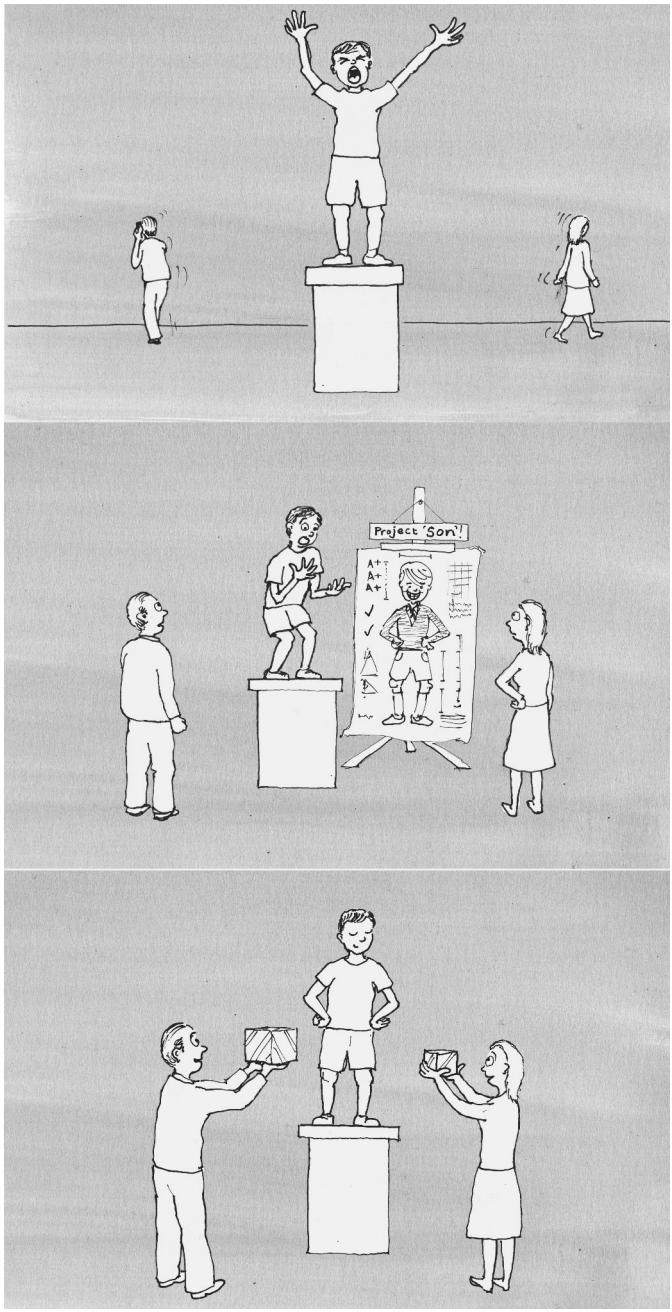
It can be very amusing to observe narcissistic professors obsessively trying to be centre stage, putting their names on breakthrough discoveries, or using their subjective attitude to adjust truths for posterity's sake. However, in this chapter, we will leave science to take a look at psychology. Where does narcissism come from? We will now look at how this question is addressed in social-personality literature and in the next chapter by evolutionary psychology.

Clinical observations and theoretical works suggest that narcissism is strongly influenced by parenting. This is in line with psychodynamic theories, which postulate that early life experiences have an enduring effect on personality organization. Using reviews by Robert Horton as references (Horton, 2011; Horton et al., 2006), we will explore three groups of theories explaining the childhood roots of narcissism. The first is that narcissists were psychologically wounded during childhood because they did not receive the attention that they needed. A second position views narcissism as the result of a mode of parenting that uses the child to fulfil the parents' own needs. The third is that narcissists were somehow spoilt in childhood, receiving too much admiration.

The developmental roots of narcissism

A first group theory proposes that parental neglect or rejection might lead to narcissism by creating a sense of deprivation (see Figure 9). The child has no image of the parents to internalize as a model, and narcissistic disturbance carries over to adulthood, as the individual remains dependent upon impersonal feedback for validation. Examples of parenting defects could be the distancing or regular physical absence of one parent, favouritism towards another member of the family or abandonment of the family by a parent. We can hypothesize that the inflated self is a desperate mechanism to attract attention from the entourage that the individual had been lacking. This would explain why such children might raise themselves onto a pedestal to try to obtain from others the approval they did not receive from their parents. The child comes to believe that he is himself or herself the only person who can be trusted and therefore loved. Indeed, the most severe form of narcissism could derive from parental absence or defective parenting. Certain situations such as extreme

➤ Figure 9: Theories of the childhood roots of narcissism
The first theory posits that narcissists were psychologically wounded during childhood, because they did not receive the attention that they needed (top). This could be because they were abandoned by one of their parents or because they don't consider that they received the same attention as other siblings. A second position views narcissism as the result of a mode of parenting that uses the child to fulfil the parents' own needs (middle). It shows parents who unconsciously transfer their ambitions onto their child, connecting affection to success. The third is that narcissists were somehow spoiled in childhood, receiving too much admiration (bottom). This type of education teaches the child that he can easily manipulate others. While social personality psychology gives a strong emphasis on parenting, the origin of narcissism difference might be better explained in the general evolutionary framework of parent-offspring conflicts (Schlomer et al., 2011).


Project 'Son'!
A+
A+
A+

poverty and/or belonging to a disadvantaged ethnical minority could increase the feeling of specialness and envy towards others (Debray and Nollet, 1997). A slightly different perspective is presented by Otto Kernberg, who proposes that parental coldness combined with extremely high expectations are factors promoting narcissism in children (reviewed in Horton, 2011).

The second group of theories views narcissism as the result of insidious psychological control when the parents transfer their frustrations and ambitions onto their child. The object-relation viewpoint is a psychodynamic theory proposed by Arnold Rothsein in 1979 (quoted in Horton, 2011) in which parental behaviour is driven by two motive systems that might enter into competition, but when balanced can lead to effective parenting:

- One that is focused on the self: how is my child meeting my needs?
- One that is focused on the child: how can I meet my child's needs?

By contrast, parenting that is too self-focused can lead to narcissistic offspring – egoistic education connects parental displays of love with behaviours that meet the parents' standard of success. Child narcissism appears as a defensive reaction to a style of parenting that uses the child as a mean to satisfy the emotional need of the parents. As Karen Horney said in 1939, 'Parents who transfer their own ambition to the child . . . develop in the child the feeling that he is loved for imaginary qualities rather that for his true self' (quoted in Horton, 2011). In this case, childhood narcissism is the expression of a desperate and continuous effort to gain recognition from idealized people (initially parents and later other members of the society judged as important). This approach converges to suggest that a child's narcissistic self is a response to parental narcissistic use of the child – narcissism arises when the parent behaves as if the

child was a means to fulfill selfish motives, not as an individual to be nurtured.

The third group of theories suggests that parents that give excessive affection to their children, while setting few limitations or rules, might give them the idea that they are superior and entitled – two cornerstones of narcissism. As Theodore Milton said in 1981:

> Children that have been exposed repeatedly to acquiescent and indulgent parents will expect comparable treatment from others, and they learn to employ the presumptions and demanding strategies that quickly elicited favored reactions from their parents. (Quoted in Horton, 2011)

According to Milton, such parental behaviours teach children that others are beneath them and can be easily manipulated, beliefs that form narcissism's interpersonal core. We will see later that this third cause of narcissism, parental over-evaluation, could explain a recent rise of narcissism in today's society (Brummelman et al., 2015).

Instead of using a typological parenting approach, Horton has analysed the influence of three parenting dimensions on narcissistic traits using a cohort of college students (Horton and Tritch, 2014). The three tested parenting dimensions were:

- Warmth. This refers to child-centred behaviour, such as providing emotional and material resources.
- Monitoring. This refers to a parent's keeping track of what their child is doing and their attempts to establish and enforce rules on the child.
- Psychological control. This refers to a parental tactic that intrudes into the psychological development of the child, by manipulating via guilt induction or withdrawal of love. This is considered a particularly insidious mode of education that undermines the development of child autonomy.

Horton showed that while parental warmth was positively correlated with healthy and unhealthy narcissism, psychological control was correlated only with unhealthy narcissism. Narcissism, in both forms, was negatively correlated with monitoring. This confirms the third group of theories indicating that parents who lavish affection on their children without setting boundaries for them enable the narcissistic self to develop. Psychological control was the only parenting dimension to predict an unhealthy narcissism score.

There is substantial evidence suggesting that the grandiose and vulnerable forms of narcissism have different etiologies. The correlation between parental overvaluation and grandiose narcissism suggests that some facets of narcissism, such as sense of superiority and entitlement, are linked to early experiences of indiscriminate praise. On the other hand, vulnerable narcissism seems to be linked instead to emotional control, parental coldness and a difficult childhood (Kernberg, 1978).

It is interesting to note that whatever its origin, narcissism is a trait that will tend to show an apparent maternal inheritance through parenting – narcissistic parents will tend to produce narcissistic children. Children that become narcissistic because of poor parenting (theory 1) will tend to become unstable parents themselves because of their difficulty in establishing enduring relationships. In the same line, a child that becomes narcissistic because he is prisoner of the parents' ambition (theory 2) will tend to transmit the same value to their child. Finally grandiose narcissistic parents will tend to overvalue their progenies (theory 3), because of the oversizing associated with the inflated self, resulting in the transmission of the trait to their child, so *special* and *unique*.

It is important to keep in mind that most studies are based on correlations, and that the orientation of the causal relation is not very well known (Horton, 2011; Horton et al., 2006). These studies point to defective parenting, but it cannot be excluded that it is the narcissistic child itself that induces a specific parenting

response from its parents. High self-confidence and high self-esteem traits in healthy narcissistic children may arouse particularly loving responses from parents, with more freedom and more indulgence. On the other hand, children high in unhealthy narcissism, filled with feelings of entitlement and privilege, could induce the parents' psychological control tactics, reflecting in fact a desperate parental tentative to regulate their child's behaviour. A 20-year longitudinal study analysing parental style and narcissism in children at three years and 23 years of age confirms a role of parenting style in the development of narcissism, but also suggests that young children vary in temperamental proclivities towards narcissism. Thus, the development of narcissism may depend on genetic factors together with environmental factors, especially parenting style (Cramer, 2011). The respective contribution of genetic and environmental conditions in the development of narcissism is not fully known.

Narcissism is marked by a difficulty in 'getting along' with a primacy given to the self. We can speculate that rituals and synchronization (e.g., meals together, belonging to a community) oppose the development of this personality. It would be interesting to know if babies who do not synchronize rapidly with the circadian rhythm of their parents, and impose their own rhythm instead, also correlate with certain personality traits. Although all these theories revolve around similar ideas, more work is required to understand how diverse forms of parenting might result in different type of narcissism. Thus, an important line of research is to better understand the roots of narcissism possibly by following cohorts of children and parents to decipher the respective roles of parenting and the child's own influence.

Narcissism in the academic world

Using these theories, certain forms of narcissism observed in the academic world could be explained. For example, the son of a high-

status father preoccupied by his work (such as a university professor or a medical doctor) and who grew up in a family with very high academic expectations might become narcissistic. This would explain why some scientists who are high in narcissism sometimes have a special relationship with their father. Supporting this notion, a study shows that scientists are disproportionally first born and come overwhelmingly from families of professional occupations and higher education (Feist, 2006, 131). It is expected that the first son gains more attention from his parents, and behaves somewhat narcissistically in order to keep the premier place in the eyes of his parents. The observation that a very high frequency of eminent scientists, notably Nobel Prize winners, are themselves sons of professors echoes the psychodynamic view of narcissism origin, in which children for the best and the worst become prisoners of parental ambition.

Along the same lines, narcissism could develop in children whose parents failed to fulfil their own youthful ambitions and who had an abusive parenting style, using their children to meet their own needs. Examples could be parents that connect affection with the scholastic success of their children, thus increasing the sense of competition. Interestingly, Feist reports that there is a consistent body of evidence suggesting that being within two generation of immigrating to the United States is related to scientific interest, talent and achievement (Feist, 2006, 74). This immigrant effect could be explained by the dual-cultural lens that fosters hard work (to validate the parents' sacrifice in immigrating) and allows multiple simultaneous perspectives, which fosters creative thinking (Feist, 2006b). But, it cannot be excluded that the loss of status associated with immigration, and the feeling of being different from others favours narcissism.

In the next section, we will visit the figure of the fascinating mathematician Alexander Grothendieck, whose personality features could be attributed to a feeling of abandonment during his difficult childhood.

The birth of a genius: Alexander Grothendieck

When Alexander Grothendieck died on November 2014, newspaper headlines proclaimed the loss of a genius: one of the most important mathematicians of the 20th century and possibly of all time (Scharlau, 2008). When I spoke with a mathematician colleague about Grothendieck's achievements, he exclaimed, 'Grothendieck is as important as Pythagoras!' Earlier we hypothesized that fascination is often linked to N-drive, not only to actual scientific performance. While I will not discuss his scientific contribution, the case of Grothendieck is interesting because it allows us to witness in vivo the establishment of a brilliant and legendary figure. The personality of Grothendieck is singular and fascinating – he is clearly far from the aristocratic figures of Niels Jerne and Jacques Monod. Nevertheless, he has traits that evoke narcissism, notably a certain difficulty in 'getting along' with others and establishing enduring relationships.

Grothendieck had a very difficult childhood. From the age of six to eleven, he was effectively abandoned by his parents and left in the care of a protestant minister in Germany. At the start of World War Two and at the age of 14, he was reunited with his parents, only to later lose his father, who was of Jewish origin. Psychological studies suggest that narcissistic disturbance, notably the vulnerable form, can arise from a deprived childhood and defective parenting. The inflated self is viewed as a desperate way to get attention from others. In the case of Grothendieck, the feeling of specialness could have been reinforced by the fact that his parents were both anarchists, who by definition cultivate their difference. Evolutionary psychology has taught us that under an unstable and impoverished childhood, notably in the absence of a father, the child interiorizes the notion that life is unstable and short lived. This orients him toward an impulsive type of personality, favouring unstable romantic relationship and risky behaviour, because urgency has more chance of paying off in an unstable environment. Hence,

this theory could explain the unstable character of Grothendieck, his difficulty in establishing enduring relationships with colleagues and his impressive striving for achievement. Consistent with the short-term mating hypothesis (see below), Grothendieck had five children from three different mothers and did not live a normal family life. He more or less abandoned his children, thus reproducing the situation he experienced in his childhood.

Grothendieck's life could almost be considered mythic. As a young student, he was given a list of fourteen unsolved problems by mathematician Laurent Schwartz. After only a few months, he had solved them all and had simultaneously produced the equivalent of six doctoral theses. He is said to have developed a new way of doing mathematics at a distance. Grothendieck worked for many years at the Institut des Hautes Etudes Scientifiques (IHES), near Paris, one of the world's most renowned mathematical centres (see Figure 10). While Grothendieck fascinated his colleagues, he was also a source of exasperation, through his inability to establish normal relationships with people at the same level. His life was scattered with abrupt decisions, the most surprising being to suddenly withdraw from scientific life in 1970 at the age of 42, at the apex of his career, breaking more or less all contact with his former colleagues. This surprising decision was made when he learnt that the IHES institute received a small amount of financial support from the army – this was in opposition to Grothendieck's anti-militarist vision. This choice could be difficult to understand for some of us. Psychology tells us that a poor childhood often induces a vulnerability, which is characterized by a tendency to overreact to a simple discomfort. It is interesting to note that later in life he was interested in spirituality and succumbed to religious mania in his retirement. The vulnerable form of narcissism is associated with up and down phases and the profound sensation of being a failure. It is reasonable to believe that the religious experience was an attempt to cope with his psychological instability and feeling of abandonment.

Figure 10: The birth of a genius: Alexander Grothendieck

Alexander Grothendieck, giving a seminar at the Institut des Hautes Etudes Scientifiques (IHES). Credit: © René Bouillot, IHES collection.

At the time of Grothendieck's death, one journalist headlined his article, 'Grothendieck, the Genius Who Wanted to Be Forgotten,' because of his reclusive life in the countryside. This is a bit naive, however, and it could be said that Grothendieck did all that was needed to be done to ensure that the details of his mythic life would be retained for posterity. He wrote hundreds of pages of essays that he sent to some of his colleagues. He even left a large box full of written documents. This is not the usual way in which one attempts to be forgotten! Of course this capacity to fascinate and to focus attention is not an intentional strategy but the consequence of a personality trait. Today his life is the subject of multiple biographies and could become the subject of a movie.

This brings me to the interesting question of the process of geniusization, through which one individual within a community becomes the focus of attention. Mathematicians are usually described as being solitary, but Grothendieck did most of his work in close contact with colleagues (all very influential mathematicians) and many of his papers were even corrected by his peers. Thus, from an amazing breeding ground of talent, emerges a singular individual. We can speculate that Grothendieck combined exceptional S- and N-drives, the latter creating fascination and putting him at the centre of attention. Were Pythagoras and other scientific legends from the past singular geniuses or rather selected great thinkers who rose above their community because of their high N-drive? We will never know. It appears that scientists, like other humans, need their heroes and saints to worship. In a way, this fascination makes sense. A biographer has more chance of selling a book describing a figure like Grothendieck than some exceptional scientist who happened to have an apparently boring private life or by describing the contribution of a community of scientists. Mathematicians' idealization of Grothendieck could be understood as a mechanism for strengthening the discipline by occupying media space.

The Grothendieck case illustrates the complex relationship between personality and scientific achievement. Taking into account his tragic childhood, his impressive contribution to mathematics could be seen as a way of getting the attention that he did not receive in his youth. It is possible that the logic of mathematics offered to his chaotic mind unique moments of plenitude.

Chapter 12

Can Evolutionary Psychology Decode Narcissism?

Evolutionary psychologists try to decode human behaviour in the light of Darwin's evolutionary theory (Buss, 2012; Gaulin and McBurney, 2004). This emerging field of psychology hypothesizes that many traits of human psychology and behaviour have a genetic basis and that the underlying alleles have been selected for during our past evolution. Evolutionary psychology relies on theoretical models of evolution, the study of animal behaviour (notably primates), as well as observation and experimentation with humans from traditional and modern societies.

There are two interesting aspects to this evolutionary psychology approach. First, it provides intriguing perspectives upon the possible origin (i.e., ultimate explanation) of personality traits, which are viewed as past adaptations for solving problems of survival and reproduction. Second, it provides new insights into the underlying nature of cognitive modules and provides hypotheses to explain why they can become maladaptive in our present time. Evolutionary psychology puts a major emphasis on the tacit dimension underlying human interaction, which is a key focus of this book.

An important research axis is to understand the origin of a personality and its underlying biological basis. Studies on twins suggest that most personality characteristics such as the Big Five dimensions are

30% to 50% heritable and 50% to 70% due to environmental influence (Larsen and Buss, 2005; Vernon, 2008). This distinction can, however, be blurred by many masked factors inherent to this type of study. It is important to recall that the interaction between genes and environment is extremely complex and often bi-directional. We are not passive recipients of our environment. Instead, we mould, create and select our habitats according to our genotypes. This chosen environment then influences the development of our personality (Larsen and Buss, 2005, 163–70; Gaulin and McBurney, 2004, 17–23). Thus, while evolutionary psychology provides a biologization of human behaviour, it also reveals its extreme plasticity. This is illustrated by personality traits, which are highly responsive to local conditions as seen by the influence of parenting on narcissism.

The non-negligible heritability of narcissism (Vernon, 2008) suggests that this trait may have been selected for during the course of human evolution. We will analyse two related hypotheses that link narcissism to social dominance and short-term mating strategies.

Narcissism and social dominance

Scientists sometimes call a renowned professor with narcissistic traits an 'alpha male', the name given to the leader by strength of a monkey, ape or wolf group. This is in line with the idea that narcissistic traits could be linked to dominance, a feature observed in primate and canine societies. To address the relationship between dominance and narcissism, let's review current knowledge of social dominance in non-human primates and in humans inspired from a textbook from David Buss and a review from Denise Cummins (Buss, 2012; Cummins, 2005).

Primate societies have been shaped by social dominance

A dominance hierarchy refers to individuals within a group, which repeatedly gain better access than others to key resources that contribute to survival or reproduction. Dominance has been well characterized in non-human primate society, with the high ranked male having an increased sexual access to females: a dominant chimpanzee (the famous alpha male) can secure at least 50 to 75% of copulations, despite the presence of other males in the colony (Buss, 2012). The increase of sexual opportunities with females explains the existence of strong evolutionary pressure for the development of dominance striving traits. It also provides an evolutionary basis for sex differences in dominance, as males have a much stronger incentive than females, who have much less to win. In many primate societies, males use their dominance primarily to restrict the access of other males to fertile females in their group, thus increasing their chances to father the progeny inside their community. For females to strive for dominance would be a less useful energy investment, as in any case they are in control of reproduction, by controlling and selectively favouring male access (Buss, 2012; Trivers, 1972).

In primates, dominance involves the use of force or threats and results in the hierarchical organization of animal society. To avoid costly confrontations with higher-ranked males, sophisticated cognitive abilities have been developed in primates to assess one's own fighting abilities relative to those of others and define the status in a colony.

Although the study linking hormones to behaviour is still in its infancy, studies suggest that dominance in male primates correlates with two hormones, testosterone and serotonin, in a two-way interaction – higher ranked males have higher levels of these hormones and injection of the hormones into monkeys promotes their dominance (Mazur, 2005; Raleigh and McGuire, 1994).

Humans are equipped with cognitive modules favouring social dominance

Although hierarchy and status are overt characteristics of modern human society, we usually tend to attribute a sociological imprint to them, due to the influence of culture and tradition. However, there is strong evidence that psychological mechanisms similar to the underlying dominance hierarchy in primates are also present in humans and influence how our society is organized (reviewed in Buss, 2012; Cummins, 2005). Investigations of human social interactions reveal reasoning biases that are thought to reinforce the establishment of dominance hierarchies. For instance, studies also suggest that adults exhibit better face recognition memory for low-status cheaters than high-status cheaters (Mealey et al., 1996). Developmental researchers claim that children show a marked precocity for acquiring social rules and monitoring compliance with them (Cummins, 2005). These examples and others indicate that the proclivity for learning social rules and determining our status is largely part of our innate psychology.

Men strive more for status than women

As with primates, human males and females differ in the extent to which their reproductive output can vary and, as a consequence, men strive more for status. For a female, a gain in social hierarchy will have less effect on her fecundity. For males on the other hand, dominance generally increases their attractiveness to females but also puts the dominant male in a position to coerce normally unattainable females to mate with him. For men, competitive and aggressive behaviour simply pays out more. This different set of selective pressures could explain temperamental differences among sexes observed today in behaviour and occupations. Men tend to score higher on traits such as competitiveness, dominance seeking and risk taking while women score higher in nurturance (Browne, 2006, 2013).

Studies have shown that sex differences in status hierarchies are apparent in playgroups of children as young as two years old. Researchers have also observed that boys display egoistic dominance and seek attention more than girls. On the other hand, girls display nurturance and pleasing sociability more than boys.

While dominant men are more inclined to accept inequality in resource allocation and to endorse an ideology that sanctions social hierarchies, high status women express their dominance primarily through actions that promote the activity of the group. Men tend to use 'bi-strategic controller strategies' to rise within the hierarchy – coercive strategies ('I often bully or push others') as well as pro-social strategies ('I influence others by doing something for them in return', i.e. setting reciprocal obligations). These strategies can be observed very early in preschool children by analysing their reaction to highly attractive play material. Coercive strategies for controlling resource are directly immediate and aversive (threatening, taking), while pro-social strategies involve making suggestions, offering "help" and initiating (often unequal) trade (Hawley, 2010).

Cummins concludes that dominant individuals have by nature or by learning an arsenal of methods for persuading, deceiving or influencing others. She also says that the establishment of strong alliances with others, notably through the formation of reciprocal obligations, is a prerequisite to reach and maintain a high position within the hierarchy (Cummins, 2005). As observed in nonhuman primates, humans seem to concentrate their alliance-building efforts on individuals at the top of the hierarchy. These authors note that high status individuals do not need to reciprocate as often as subordinates in order to preserve an alliance. The reader will already notice that the establishment of reciprocal alliances (i.e., selective friendships) is similar to what was described earlier as networking in the context of science.

Cummins notes that females compete between each other in far subtler ways than males, ways that might be invisible to those who

do not know the game. They may have indirect ways of destroying a rival, such as spreading rumours aimed at ruining a potential rival's reputation (She's such a malicious gossip!), bitchiness, excluding or ignoring her socially, staring in order to intimidate her into silence or derogating the rival when popular boys are nearby.

Dominance is associated with nonverbal cues and the capacity to influence others

What personality traits might be associated with dominance and high status? Socially dominant individuals have higher 'mind-reading' capacity, i.e., they are better at interpreting the intentions of others, deceiving others and influencing them – qualities that favour leadership. In addition, they are better at masking their own intentions or even at lying compared to subordinate individuals (Buss, 2012).

High dominance in humans is revealed by a variety of nonverbal and verbal characteristics. Michael Argyle notes that dominant individuals tend to stand at full height with an expanded chest and with hands on hips. While talking, they often face the group and they gaze at others. They do not smile much and often touch others (Argyle, 1988; Buss, 2012). Dominant individuals often have a deep voice; men lower their voices when they believe that they are addressing another man who is lower than them in dominance. Facial dominance is indicated by a muscular face, a prominent chin and heavy brow ridges as illustrated by Jacques Monod in Figure 2.

On the other hand, the behaviour of low ranking individuals is typically the opposite: their body posture is often bent; they smile more and speak softly; they address the high-status individuals rather than the group. Submissive individuals speak less than those who are higher in status and don't interrupt those who are speaking. They listen while others are speaking and give many deferential nods (Buss 2012, 377). Submission in humans is also associated with

particular body movements, such as avoiding eye contact with others, lowering one's chin or hunching one's body posture (see Figure 11).

Figure 11: Dominance in the office

A professor in extension is shown stretching his hands behind his head, a classic dominance pose. Compare it to the submissive attitude of the student (bent, smiling, compact). For more information on dominance postures see Argyle 1998 and Amy Cuddy's Ted lecture.

Some readers might be surprised to learn that personalities sometimes manifest in the physical attributes of individuals or the way they walk. Many scientists in my field, at least the best at selling their science in the top journals, often have a mesophormic shape, with a prominent chest and strong athletic ability. Over time though, they get grey hair, some start to grow corpulent, while at the same time becoming more communal and losing their aggressivity.

Social dominance in humans: A role for testosterone?

Like primates, the relationship between androgen, neurotransmitters and social status is also observed in humans. In his book *Biosociology of Dominance and Deference*, Allan Mazur carefully reviews the implication of testosterone in human behaviour (Mazur, 2005). While the link with aggressive behaviour is still uncertain, there is nevertheless a good correlation between basal level of testosterone and status-striving personality traits in both males and females (Knight and Mehta, 2014). High testosterone is associated with dominant behaviour, such as an aggressive response to provocation. There is also a reciprocity effect as a change in dominance behaviour or social status results in a change in testosterone levels. For instance, testosterone rises in winners of sports competitions and their supporters, while decreasing in the losers. An extensive study suggests that males with higher levels of testosterone are more likely to divorce. Allan Mazur notes that testosterone level is highly responsive to changes in marital status, falling with marriage and rising with divorce. Of note, testosterone peaks in the late teens and then declines slowly as men age (Mazur, 2005), paralleling the expression of narcissistic traits. Testosterone is not the only hormone associated with dominance and may interplay with cortisol, the stress hormone, to affect social behaviour linked to status. Status is negatively related to cortisol concentration in humans. Overall, higher testosterone is positively correlated to social dominance but only among individuals with low cortisol (Knight and Mehta, 2014).

Being the focus of social attention is part of the human dominance strategy

Although violence and aggressive behaviour still play a role in the hierarchical organization of some human groups, such as the Mafia and gangs, differences in rank also rely on subtler rules. The social attention holding potential (SAHP) theory suggests that differences

in rank do not stem from differences in threat or coercion but rather from differences in the quantity of attention conferred by others (Buss, 2012; Gilbert et al., 1995). Thus, the SAHP defines the amount and quality of attention allocated to a particular person by his or her entourage. The key motivation is to be selected by others, in one word, to be popular. The theory of Paul Gilbert posits that individuals in a group enter into competition with each other to be noticed and valued by others. An individual rises in status when he or she receives a lot of high quality attention, while poorly visible individuals are relegated to a lower rank. In line with the SAHP theory, an old study from David Moore and Thomas Trout (1978) analysed promotion in the US army by comparing two theories: i) the 'performance theory' which says that promotion in the military goes to those who perform best, and ii) the 'visibility theory' which stresses the importance of being seen and known and having contact with peers and mentors who can influence one's upward mobility (Moore and Trout, 1978). Their analysis suggests that promotion in the US army is based less on performance than on the ability to be viewed by individuals from a superior rank. A war period can change the situation, but not because of actual performance in wartime but rather by allowing individuals to become more visible to their superiors. This theory echoes the SAHP theory by underlying the importance of visibility for climbing the hierarchy ladder. In science too, visibility by important members of a community has tremendous influence on career progression.

Another interesting aspect of Gilbert's SAHP theory is that moods or emotions may be a consequence of changes in rank. Going up produces euphoria that signals a rise in status, plummeting in status leads to the onset of social anxiety, shame, rage or envy. Shamed individuals perceive themselves to be small, inferior or contemptible. Thus, a scientist who submits his best article to a top journal (unconsciously he is seeking recognition by increasing his SAHP) and who then receives adverse criticism by the reviewers may become

depressed, just like a chimpanzee losing a ritual fight that might have allowed him to rise in the hierarchy (see Figure 12). The dominant members of his community block his access to a higher rank and maintain him in a subjugated position associated with shame and resentment. By contrast, having a paper accepted in one of the best journals, being invited to a prestigious conference or even delivering a well-received talk provides a feeling of exultation and happiness, increasing one's self-esteem. An interesting approach, the sociometer theory, revisits the self-esteem concept by proposing that self-esteem represents a status-tracking mechanism; an increase in the degree to which one is socially included and accepted by others would result in a concomitant increase in self-esteem (Leary and Baumeister, 2000). The importance of social acceptance was so critical during human evolution, that it led to the development of a mechanism that enables an individual to track his degree of acceptance by others. This cognitive device provides an accurate self-assessment of one's place in the social hierarchy and helps when making decisions about challenging or submitting to others. Importantly, self-esteem is shaped by the perception of social acceptance and not social acceptance itself. Difference between perceived and real acceptance would explain why certain people overvalue (high self-esteem) or depreciate (low self-esteem) themselves in social interactions.

Two paths to the top: Dominance and prestige

In 2001, Joseph Heinrich and Francisco Gil-White proposed that social ranks in human societies are more complex than in primates (Cheng and Tracy, 2014; Cheng et al., 2013). They distinguish two paths for rising within the hierarchy, *dominance* and *prestige*. Dominance refers to the induction of fear, through intimidation and coercion, to attain social rank. In contrast, prestige refers to social rank that is granted to individuals who are recognized and respected for their skills, success and knowledge. Dominance arose

Figure 12: Dominance in science

After a year of success with his team, this young professor is found bent and depressed in front of his computer. He has received harsh criticism on the paper that he thought would be a milestone in the field and would have changed his career and that of his students. He doesn't yet know that next month, two papers will be published reporting the same findings. He will bitterly regret having presented his results at the last meeting in front of his community, a short moment of exultation that is now costly. As the initiator of this discovery, he will still be able to publish his story in a second-order journal a bit later. The scientist is shown bent, which reveals a submissive position. How could he fight against two charismatic leaders (visible in the two portraits above his computer). One is an outstanding scientist with an impressive network formed by numerous protégés. The other is a distinguished man with no apparent scientific skill, but whose remarkably self-centred character justifies life as a permanent tourist in expensive hotels and restaurants. He is currently travelling with his mistress, a young postdoc who has become a rising star in the field. What the poor scientist did not know about was the eagerness of the editor to ensure a fast-track review of the dominant professors' papers. The young professor will have to attend many plenary talks given by these two charismatic professors, with frequent ovation from his community. He will have to work hard and will have heavy teaching duties while the others spend their time travelling around the world. Later in his career, he will receive a prize for his scientific contribution from one of them, which he will accept with submissive smile.

in evolutionary history as a result of resource allocation among nonhuman primates, but continues to exist in contemporary human societies. In contrast, prestige is thought to be mostly specific to humans and would have emerged in the course of evolution to favour the transmission of cultural knowledge from skilled and experienced individuals. Depending on the context, both leadership approaches may operate concurrently, and individuals can pursue either path to successfully ascend the hierarchy.

Personalities and tactics between these two paths differ. Individuals who tend to use a dominance strategy are more aggressive, whereas those who use the prestige strategy have higher self-esteem, are more conscientious and prefer to be socially accepted. In contrast to dominant individuals, prestigious individuals exert an influence that is dependent on the consent of their followers. Prestige strategies are sustained by distinct characteristic verbal and nonverbal cues (Cheng and Tracy, 2014). For instance, while in group situations dominant individuals tend to show spatially expansive postural displays, as described earlier (e.g., wide postures), prestigious individuals are more discreet, displaying pacifying gestures that communicate competence and confidence (e.g., chest expansion, small smile, head tilt up).

Leadership in contemporary human social groups

In agreement with the social attention holding potential (SAHP) theory, studies have shown that in humans the position of an individual in the hierarchy is largely based on the group's collective judgment. It should therefore be expected that leadership be given to individuals who are both competent and devoted to the interest of the group (Anderson and Kilduff, 2009a). However, the personality traits that predict who may emerge as leader are 'dominance' and 'thirst for power', neither of which largely correlate with competence or communal orientation (Anderson and Kilduff, 2009b). This is

illustrated by paradoxical choices of leadership in democracy that often results in the selection of ambitious and dominant politicians rather than competent and caring ones.

Since status-striving individuals do not achieve high status by bullying and intimidating because these attitudes are not valued inside the group, Cameron Anderson and Gavin Kilduff have investigated the mechanisms by which individuals high in dominance reach the highest status. Their studies indicate that they climb in the hierarchy primarily by enhancing their value in the eyes of other group members. They behave in a manner which communicates task competence, generosity and commitment to the group.

They note that dominant individuals, who were not actually any more competent than average, nevertheless seem more competent because they appear highly confident (assertive, taking initiative). They refer to this strategy as 'enhancing apparent competence'. Consistent with the SAHP theory, these dominant individuals perform visible actions, which signal their commitment to the group through displays of selflessness. This is different from truly altruistic actions towards the group, which are rarely noticed and do not help in climbing the hierarchy. Anderson and Kilduff refer to this strategy as 'enhancing apparent commitment to the group'. The third mechanism used by dominant individuals to raise their social standing is to engage in networking with other group members. The authors underline that by establishing social alliances, these individuals are not lost in the crowd, and get recognized even in a larger group (Anderson and Kilduff, 2009a). As a consequence, dominant individuals improve their visibility by developing ties with fellow group members. These findings would explain why extroverts and those high in the need of power (notably narcissists) consistently attain leadership position within larger social communities, since they attract more attention to themselves and establish a broader range of social relationships.

Narcissism and social dominance: Two side of the same coin?

This succinct summary of exciting studies of dominance hierarchy in humans may shed some light on narcissism. Narcissists, with their neat appearance often associated with physical attractiveness, their deep understanding of social relationships, their capacity to forecast and to influence the behaviour of others, their strong investment in forming powerful alliances based on reciprocal obligations (networking abilities), and their constant presence at the centre of attention, show many if not most of the traits associated with dominance. Grandiose narcissism is characterized by high self-esteem, which according to the extended sociometer theory signals a high position in the hierarchy (Kirkpatrick, 2006). The social attention holding potential theory (SAHP) helps us to understand why narcissistic scientists unconsciously choose for their strategic positions to be centre-stage, because 'social attention' equates with 'high status'.

It is interesting how such a simple idea as the SAHP theory can make sense of so many human attitudes in daily life. Box 6 shows examples analysing classic behaviour shown by professors high in narcissism. The behaviour of narcissists maintains a maximum of attention focused on them while sparingly distributing their own attention to others and directing it to strategic individuals. This explains how narcissists insidiously depreciate their surroundings. All these ideas from social dominance studies, notably the SAHP theory, shed light on narcissism whether in regards to famous celebrities or ordinary narcissists in their family context, who always seem to be in the centre of all photos (see Figure 13).

Could narcissism and dominance be two sides of the same coin? All the observations above suggest that narcissism as defined by social-personality literature consists of personality traits that are associated with social dominance as viewed by evolutionary psychology. Actually, the two constructs, narcissism and dominance are

Figure 13: The professor of immunology and his collaborators

Professor Maurice Carraz, head of the Immunology Department at the Institut Pasteur, Lyon, is shown above with his team. The professor is highly visible on the right in black. The contrast between the white coats and the black suit highlights the clear separation between 'bench' and 'brain' work. His powerful position is reinforced by his entourage, with fifteen of the sixteen collaborators being female. It is difficult to resist the temptation to project the social dominance relationships observed in primate society onto academic life with the dominant figure of the professor of medicine. Although, this image is somewhat dated, narcissistic professors are often immediately obvious in laboratory photos, with an advantageous pose. Credit: Collection Bibliothèque Municipale de Lyon, 1968. Photographer: George Vermard (P0702 B02 11 775 00002).

so similar that sometimes the labels are interchangeable (Holtzman and Donnellan, 2015). An evolutionary psychologist Jessica Tracy and her colleagues have already elaborated on this topic (Tracy et al., 2011). For her, narcissism would define individuals who, due to early life experience, and specific genetic disposition are more inclined to adopt a dominance oriented strategy to status attainment.

She considers that dominance is likely to be most profitable for individuals who by their personality or physical attributes are better at coercing and threatening others (large physical size or strength and agency personality trait) but are lacking the skills, competencies or intelligence required to elicit prestige. Thus, 'although dominant individuals, like narcissists, tend not to be well-liked, they do tend to be powerful; they essentially make the adaptive choice of getting ahead at the expense of getting along.'

My personal analysis of the influence of narcissism in science was made before I came across the dominance-prestige literature. It would be tempting to associate the N-drive to dominance and the S-drive to prestige, but the situation is more complicated. We have seen that prestige is largely accorded on the basis of *perceived* rather than *actual* competence and commitment to the group. There is a propensity to confer prestige and high rank to overconfident individuals with high visibility and high network ability. Thus, narcissistic individuals are perfectly equipped to ascend hierarchies using the prestige route because they behave in ways that make them appear more competent, generous and committed to the group's success than they actually are. Thus, it is likely that the N-drive includes both, the influence of dominance and the self-enhancement elements related to the prestige strategy, blurring the separation between the concept of prestige and dominance.

In fact, the same professor who applies the prestige strategy to convince his peers of his own skills and competence is likely to resort to a dominance strategy towards his employees. These subordinate lab members, who know him well enough, are less likely to fall for his public prestige façade, but they can be easily subdued by threats and aggressive behaviour. We could place narcissistic scientists, who are the focus of the essay, somewhere between two extremes. At one extreme are physically strong individuals with a very direct style, often with a deep voice and a high capacity to stress others; they mostly use the dominant leadership strategy. The second extreme

rather refers to the charismatic, confident and networker scientists with a charming attitude, who rely mostly on the prestige strategy.

In conclusion, it is likely that narcissism, a visible human personality trait, can be viewed as a relic of our primate heritage in organizing the hierarchy within the group. An interesting side effect of this hypothesis is that the vocabularies and concepts used in the study of dominance can easily be transposed to study narcissism in scientific organizations (reciprocal alliances, bi-strategic controllers, SAHP).

One question for the future is to understand how narcissism, a personality, precisely relates to social dominance hierarchy, as the relation might not be as trivial as it seems. Dominance hierarchy evokes the possibility of mobility in the pecking order, and relates also to some extent to the situation of power rather than to a personality. Thus, it could be said that narcissism does not necessarily translate to dominance itself but rather to the capacity to endorse a hierarchical dominance. Narcissism would be a predisposition that would favour the establishment of a social hierarchy. The 'getting ahead' rather than 'getting along' dimension of narcissism could favour this differentiation required for the establishment of hierarchy.

Let's imagine two siblings in a family with the older one being excellent at school, a feature highly valued by the parents. If the younger sibling is high in narcissism, she will suffer from this situation and will unconsciously find another way to get the attention from her parents she feels is her due. In some cases, the neglected sibling might quit learning altogether or engage in risky behaviour, such as joining a gang or developing an eating disorder. This child will prefer to attract the parents' attention by a major teenager crisis rather than by struggling to rise above average at school. This example illustrates that narcissism is not associated with climbing up the hierarchy ladder but rather with social differentiation.

This favours the hypothesis that views narcissism as a predisposition to rapidly endorse a social hierarchy. An example could be a nice young medicine student who rapidly endorses the narcissistic

attitude so characteristic of his professors as soon as he gets his diploma in pocket.

Based on our observations, we have speculated that people higher in narcissism tend to be fascinated by leaders with a high N-drive. This fascination also participates in the establishment of hierarchy. This mechanism could be of high adaptive value in a social species like humans. We could imagine that a human group subjected to a period of instability (e.g., high male mortality in war time), which would induce difficult parenting condition (e.g., absence of fathers), could increase narcissism in the progeny. The progeny would be more sensitive to N-drive, which would then favour the establishment of strong leadership that could reinforce the survival ability of the group. This simple mechanism could explain the fascination of popular masses for a dictator after a long period of crisis.

The oversizing associated with the inflated self is also a feature that would increase differentiation. A surprising reason for why some disadvantaged minorities seem to accept an unequal society in the US is that they themselves expect to become rich. This is the traditional optimism of Americans, and their dream of becoming rich and famous while often experiencing poor living conditions. In this line, studies in the US show that 31% of high school students expect to become famous someday (Twenge and Campbell, 2009), while in fact, probably only about 0.1% of people actually succeed. Thus, this overconfidence (consequence of the inflated self) also participates in the establishment of a social hierarchy, creating fascination for the dominant ('celebrities') and an acceptance of inequality due to the unrealistic expectation that one day they will join the ranks of the dominant. Finally, narcissists are also obsessed by ranking and by the need to define an elite. This central dimension of narcissism would favour the establishment of a steeper social dominance scale.

Dominance and the vulnerable form of narcissism?

Evolutionary psychology studies have principally focused on the grandiose form of narcissism, but the vulnerable form deserves some attention. When speaking about her high-ego colleagues in the institute, one of my female colleagues told me that they fall into two classes: the simple ones and the complex ones. The simple ones refer to the grandiose ones, and it is true that they are easy to understand once we have become familiar with personality types. The complex ones, at least some of them, could refer to a healthy form of vulnerable narcissism. Many scientists exhibit a rather sensitive personality with up and down phases and a complex timidity associated with grandiose dreams. They are extremely sensitive to other people' opinions and often personalize harmless statements in a discussion. In the most severe form, this vulnerability is associated with a difficulty at handling criticism, which could be seen as a strategy to protect the self-esteem (i.e., the status). When someone overreacts and personalizes seemingly insignificant elements of a discussion, we henceforth tend to be very careful with that person in order to prevent any confrontation. This confers a special status to the individual and suggests that the vulnerable form of narcissism could also be linked to social dominance hierarchy. How does vulnerable narcissism fit in to social dominance? Are they the dominant ones that fail to reach the summit they feel they deserve and therefore stay on the sidelines? Are they sufficiently empathic individuals that clearly see the needs of others, while simultaneously resenting their own needs not being met? This would explain the concomitant desire for recognition and success, and the shame associated with this feeling. Analysis of the vulnerable form of narcissism requires further investigation.

Box 6: Revisiting a narcissistic professor's behaviour in the light of the Social Attention Holding Potential (SAHP) theory

The SAHP theory posits that dominance in human society is largely linked to the quality and quantity of attention that is bestowed on us by others. This theory can be used to revisit the behaviour of narcissistic professors to maximize attention and increase their status.

- Writing a paper is not usually a difficult task for most professors, so why do they keep papers on their desk for months, driving students to despair? (In order to extract maximum attention from the inferior students, making them realize how important their professor is.)
- Why do some professors in a faculty fail to respond to e-mails dealing with communal duties (e.g., teaching) despite several reminders, or always hesitate when asked for an easy service? (This is a way to obtain maximum attention – their time is costly.)
- Why do they stay self-absorbed at the rear of the conference room, concentrating on their electronic device or strategically reserve their maximal attention to specific orators? (Because looking at someone gives them value.)
- Why don't they go to other people's offices (secretary, professor), obliging others to come to them? (Hosting is a mark of power.)
- Why do they insistently emit strong opinionated statements during discussions? (It is the best way to be at the centre of a conversation.)
- Why are they always highly visible in the laboratory photo, with an advantageous pose? (To capture the most attention.)
- Why do they often ruthlessly exceed the time limits of their talk, which is considered rude and arrogant among scientists? (To ensure maximum attention. They are not usually aware of doing it, but this is simply due to the fact that narcissists overestimate their capacity to deliver the talk in the time limits and care less about others.)

Narcissists have an innate aptitude to hold back their attention from others (usually it is only reserved for strategic players) while remaining centre stage. It is by monopolizing others' and sparing their own attention that they subtly depreciate others. It is important to repeat here again that they do not do that on purpose but as an innate behaviour. A colleague once told me that when observing a video recording of an achievement of his second son, he was surprised to see his first son repeatedly passing in front the camera as if he wanted to mask his little brother. This type of behaviour is in line with the SAHP theory – to maintain his status as the favourite, he seeks to retain attention. Narcissistic professors are not much different.

Narcissism and short-term mating

We have previously mentioned how the laboratory is often the mating ground for professors. We encountered the figure of a narcissist marred with infidelity and promiscuity, exemplified by Niels Jerne. We have evoked the grandiose mandarin with his impressive objective attitude in front of his academic colleagues, but who cannot help inappropriately touching his female lab members. More frequent is the 'rotating wife phenotype' which refers to the sudden fascination of the middle-aged professor for the clever young female student or postdoc, and who provides a good justification for replacing (or at least putting into the background) the old and boring spouse that is no longer useful. This professor now claims of his old spouse that 'she has so many psychological issues to solve.'

Narcissism has been associated with all these behaviours, notably that of short-term mating (Campbell, 1999; Jonason et al., 2009; Jonason et al., 2011). But before truly discussing the matter, we need to define what evolutionary psychologists mean by short-term mating. As everybody knows, real life is not always a fairy tale, and men and women aren't always engaged in stable and happy couples. In 1993, David Buss and David Schmitt extended Trivers' parental

investment theory by proposing the sexual strategies theory (Buss and Chiodo, 1991; Trivers, 1972). According to this theory, men and women have evolved a complex repertoire of mating strategies. A first one is long-term mating, characterized by a strong commitment towards the partner and the progeny, and the emotion of love. A second strategy within this repertoire is short-term mating, defined as brief sexual encounters, such as one-night stands. Along this temporal continuum are short-lived affairs, passing or prolonged romances and other intermediate relationships (Schmitt et al., 2003). Long-term mating and short-term mating are not opposite strategies and should be seen as independent dimensions, as they can be followed simultaneously (Holtzman, 2013). It is time to explore an emerging theory linking the origin of the grandiose form of narcissism to the viability of short-term mating strategies in humans.

Human monogamous families with extensive male parenting are unique within mammals; other species rely almost entirely on females for childcare. This unique feature of our species is due to the immature form of a human baby and its strikingly prolonged state of dependence, requiring enormous parental support. To maximize the child's survival, optimal parenting in humans requires the investment of both the mother and the father. This implies that in the course of human evolution, natural selection favoured traits and behaviours associated with monogamous pair-bonding since at some point the advantage of long-term relationships for parental investment began to outweigh the benefits of promiscuous mating strategies (Holtzman and Strube, 2011). This selective pressure led women to select their male partners on criteria such as the amount of resources, agreeableness and cooperativeness, metrics that correlate well with bi-parental care. This led to the development of cognitive functions promoting long-term mating strategies, rather than short-term strategies such as are observed in many promiscuous, nonhuman primates.

Nicholas Holtzman and Michael Strube suggest that this new set of selection pressures may have created variation in human

personality traits contributing to mating behaviour (Holtzman and Strube, 2011). Despite the selective pressure towards long-term mating strategies favouring bi-parental childcare, short-term mating strategies did not necessarily vanish entirely from the human species. These authors suppose that short-term mating strategies are at the core of narcissism, and that other traits associated with this personality derive from such strategies.

The authors provide evidence to back up their model: narcissism is associated with attractiveness and the use of sexualized language and charm, which could contribute to short-term mating (Holtzman and Strube, 2011). Narcissists are usually considered more attractive on first acquaintance, although this is more a consequence of self-regulatory behaviour such as spending more time on grooming. Positive illusions (i.e., inflated self) may drive narcissists into indiscriminately pursuing short-term mating opportunities, which would seem to be beyond their realistic prospects. The authors of this hypothesis also note that narcissists tend to engage in competitive behaviours, which could potentially be viewed as manifestations of a short-term mating strategy because leadership favours this type of strategy. They envisage that increasing disagreeableness in the long-term and lack of empathy (both characteristics of narcissists) could be seen as psychological devices to discourage sexual partners from maintaining the attachment bond. As soon as their current mate leaves the relationship, narcissists are free to go off looking for a new one. The need for narcissists to find a new short-term mate could be one of the underlying forces which propel them to quickly shift from one environment to the next. Thus, many manifestations of narcissism could be partially traced to one underlying evolutionary force: the strategy of short-term mating (see Box 7).

Humans tend to engage, either simultaneously or subsequently, in both long-term and short-term mating strategies (Buss and Schmitt, 1993). Since narcissism trait levels vary continuously in the human population, it might be more appropriate to see the level of narcissism

as the degree of proclivity to pursue the short-term strategy. Higher narcissism correlates with a higher tendency to short-term mating.

Box 7: Similarities between short-term mating strategies and narcissism

Both narcissism and short-term mating (STM)

- peak at adolescence (period when STM strategy is optimal),
- are higher in males than females (STM strategy can pay out more for males than females),
- focus on short-term gain, and
- relate more to emerging (seduction) than enduring (intimacy) situations.

This could explain why narcissists have been shown to

- often switch partners (rotating wives, trophy partners) or appear agitated and never satisfied,
- use a sexual language and have more sexual fantasies,
- take care of their appearance (grooming, costly outfits),
- like to be in positions that can increase their attractiveness (e.g., positions of power and respect, where they are admired by women),
- have high self-esteem, a trait that favours the initial contact and risk-taking approach (this trait is rewarded by women as it is often a sign of high status),
- often practise 'game playing' and have a 'keep my options open' conception of love (partners are interchangeable as long as they feed the ego), and
- lack empathy, which facilitates the switch from one partner to another – the partner initially found exciting is rapidly devaluated compared to a fresher one.

Dominance and short term mating: Two sides of the same coin?

Is narcissism related to short-term mating as a consequence of dominance, or is a short-term mating strategy the core of narcissism? In the first case, short-term mating is the mechanism by which dominance increases fitness. In humans, high status provides more opportunities on the mating market. Successful and rich men such as businessmen, politicians, rock-stars, sportsmen, but also intellectuals, still tend to have more sexual opportunities as illustrated by the number of affairs reported in newspapers and biographies (Buss, 2012). The alternative view sees short-term mating strategies as the underlying biological frame of narcissism, with the pursuit of leadership positions as a strategy to get access to mates. Thus, short-term mating and dominance could be seen as two sides of the same coin. In contrast to this notion, Holtzman and Brent Donnellan have elaborated a theory and proposed that short-term mating strategies and dominance could be dually selected for (Holtzman and Donnellan, 2015). Short-term mating traits directly help narcissists pass their genes on to the next generation, while dominance helps narcissists to strive for status, associated with increased resources. Selection for each of these traits would have led to their co-variation explaining the complexities of the narcissism personality. The model suggests that inputs from the environment will determine which evolved program is active at a given time.

Short term mating and passion in science

The key point to understand is that while this hypothesis views narcissism as an evolutionarily ancient cognitive module favouring this type of mating strategy, narcissism is not necessarily equivalent to short-term mating itself. These personality traits function in a completely different context nowadays. Just as most of our human sexuality is not about actual procreation, so can the short-term mating

strategy be viewed outside the actual mating context. Another view is therefore to consider the eagerness to succeed and the attraction towards leadership that drive many scientists as a way of channelling this sexual impetus for short-term mating. Passion to succeed in science, but also in art, could be a way of sublimating this short-term mating cognitive tropism explaining the perpetual dissatisfaction and the desire for novelties among scientists – and artists.

I believe that the short-term mating hypothesis of narcissism is very attractive. In addition to its plausibility, it also provides a metaphor when considering our narcissistic societies filled with celebrities, seduction and its attendant dislocated and mono-parental families. We can also use the short-term mating image to illustrate narcissism in the scientific environment. Figure 14 illustrates how we can correlate publication success, (i.e., 'the big story with no follow-up') to the re-use of the short-term mating strategy module. Students, seeing their perpetually unsatisfied professor frantically running through his laboratory, hunting for new and exciting results, might think, 'Look, there he is again in one of his short-term mating anxiety moods, looking for something exciting, spicy and flashy.' For those with more extreme phenotypes, travelling a lot and moving their laboratory to new and bigger institutions could be seen as the only way to maintain seduction over their peers. Three or four days spent in their company at a meeting would not be sufficient to detect their self-focused mind and egocentrism.

Integrating dominance, short-term mating and narcissism

In agreement with Holtzman and Donnellan (2015), my personal point of view is that both dominance and short-term mating cognitive abilities relate to narcissism and provide a coherent frame for

understanding the narcissistic personality. A complete understanding of the latter should also try to explain why parenting has such a tremendous impact on narcissistic traits. Interestingly, another set of evolutionary psychology theories provides possible insights into this point. The seminal work of Robert Trivers (1974) has shown that parents and children are expected to have conflicts. His theory predicts that children have the adaptation to extract more resources from their parents than is in the best interest of the parents or their siblings (Trivers, 1974). Conversely, parents could have the adaptation to manipulate and exploit their children in ways that are not necessarily in the best interest of their children. One of them is called parental favouritism, which suggests that, as a general rule, selection favours adaptations in parental care that favour preferential allocation of investment towards offspring that in turn are the best for the parents' fitness; i.e., parents favour offspring who are likely to provide a higher reproductive return on the investment. Taking in consideration the limited resources to invest in offspring, natural selection should favors traits and behaviours that drive parents to allocate more resources in sons high in personality traits of dominance, with inherent capacity for status striving (Buss, 2011, 43). One hypothesis linking narcissistic parenting and short-term mating/dominance is that the narcissistic mode of parenting, by inducing dominance in the child, would allow parental investment in one or a few children who are better suited to fulfilling the aspirations of the parents (i.e., who have a better chance of increasing the fitness of their parents). Psychodynamic theory notes that a 'narcissistic child occupies a pivotal point in the family such as being the only child or the only brilliant child or the one who is supposed to fulfil family aspirations' (Kernberg, 235, quoted in Horton, 2011). Parents of a single child that represents the only outcome of the family might unconsciously, through indulgence and overevaluation, transmit traits related to dominance and short-term mating to

their precious progeny. Along these lines, the psychological control dimension of parenting described before could be a psychological adaptation whose role is to promote dominance in the offspring; the child becomes a prisoner of his parents' ambitions. Dominance can already be observed in two-year old children, supporting the idea that this trait is determined early in childhood. A hypothetical way of promoting dominance would be by overfeeding the baby and catering to his every need or even anticipating them, with the idea that a physically strong baby would tend to be dominant in early social interactions. Another way to promote dominance is to unconsciously provide more attention to one child, which, according to the SAHP theory, would be a way of giving him a better status. It is expected that a child that succeeds in capturing most parental attention should score higher in the grandiose form of narcissism characterized by a high self-esteem. The next sibling in age might sense the reduced attention towards him and therefore might score higher in the vulnerable form, characterized by a fragile self-esteem and a greater sensitivity to other views. The first-born child is generally in a better situation to capture the maximum parental attention, except when the second child succeeds by his physical or intellectual attributes to displace his older brother/sister from their superior position.

However, we have seen previously that narcissism can also develop from parental neglect, and, in fact, the most severe cases of narcissism are probably associated with parental neglect and poverty. This mode of parenting could also lead progeny to orient their reproduction strategy toward short-term mating due to the absence of any parental model to internalize. In his textbook on evolutionary psychology, David Buss claims that, 'the absence of a father while growing up has been reliably linked to the pursuit of a short-term mating strategy . . . Other studies of both women and men have found that those growing up with absent fathers are more likely to reach

puberty sooner, to engage in sexual intercourse earlier and to pursue a short term mating strategy' (Buss, 2012, 196–8). The link between short-term mating strategy and narcissism provides an explanation linking defective parenting to narcissism, with the idea that the optimum strategy for a child growing up in harsh conditions is to engage in a fast life-history strategy. As an example, during his childhood, Belgian George Simenon, one of the most successful and prolific writers of all time, who sold more than 500 millions books, suffered from the (real or perceived) status of favourite given to his brother by his mother. This feeling of depreciation could explain the compulsive sexuality that this writer manifested throughout his life (Ruetschi, 2015).

There are a number of intriguing consequences to this hypothesis that might be interesting to test: i) the narcissistic mode of parenting might be more prevalent in families with a single child, where the offspring can maximize parental investment; ii) the presence of a narcissistic child in a family might evoke strong (although unconscious) parental favouritism with possible costs for other children; and finally iii) patriarchal cultures that strongly favour sons over daughters might exhibit higher levels of narcissism as a consequence of their narcissistic parenting mode. It is important to remember that all the data analysing narcissism and the mode of parenting are correlational. Therefore, it is likely that narcissism also results from conflict between offspring arising from attempts to capture a maximum of attention from their parents, resulting in grandiosity and confidence for the child capable of obtaining the maximum attention, and vulnerability and a feeling of abandonment for the others. It is in fact extremely difficult to disentangle the respective influence of parenting and offspring competition for attention. While social personality psychology gives a strong emphasis on parenting, the origin of narcissism difference might be better explained in the general evolutionary framework of parent-offspring conflicts (Schlomer et al., 2011).

Recent studies also underline that stress experienced early in life has long-lasting effect on human behaviours and personalities (Del Giudice, 2014). An interesting point would be to analyse how pre- and post-natal stress, early feeding behaviours and synchronization of the child with his parents correlate with personality.

➤ Figure 14: Publication success and short-term mating

Holtzman and Strube (2011) have proposed that short-term mating strategies have shaped the evolution of narcissism. The authors note that narcissists are usually considered more attractive on first acquaintance, notably due to their charm and self-confidence, traits that signal competence and passion. The oversizing associated with the inflated self gives narcissists the confidence to accost what they consider to be the best mate. However, when the partner no longer meets their expectations or they find a find a better match, they move easily to a new partner. This switch is facilitated by their increasing disagreeableness in the long-term, the subtle denigration of their present partner and their lack of empathy. These psychological devices often discourage the sexual partner from maintaining the attachment bond. The narcissist is then free to move to a new partner.

The observation that narcissists have an advantage at first acquaintance would explain their capacity for publishing articles in the best journals. Using the short-term mating cognitive, let's imagine a narcissistic scientist submitting an article to the editor of a prominent journal. The narcissistic scientist will be much more persuasive, due to the oversizing associated with the inflated self. The usual weapons of seduction (buzzwords, fancy style, intellectual seduction, 'next-next' generation technology) and the intensity of the transaction, filled with drama and passion (the famous 'this is a ground-breaking discovery') will rapidly lead to success. But when analysing the article at the journal club in another laboratory, it will be realized that one figure is incorrect, that the main concept was already mentioned in another, uncited paper and that the interpretation is quite trivial once the spin and other stylistic effects are removed. At the end of the journal club, a student exclaims, 'this paper is a bit like a Hollywood movie; the content is weak but you get swept along by its special effects.' Of course, the narcissistic scientist has already forgotten the story and has moved on to his next target with the same passion: 'This is a ground-breaking discovery!'

Why are humans so diverse in term of personalities?

To conclude this section on the underlying biological basis of personalities, we will discuss the fascinating question of why humans are so diverse in terms of personality (Buss and Hawley, 2011). Despite recent interest in answering this question, little is still known on this topic. Although there is substantial heritability of personality features, broad genome-wide association studies (GWAS) did not spot a single gene that could be associated with them (Holtzman and Donnellan, 2015). One reason could be that there are multiple genes responsible for a complex phenotype like a personality,or that personality could be under the influence of rare variants undetectable by this approach. There are nevertheless a number of models to explain variation in personality in humans. The first one suggests that personality variation persists over evolutionary time due to intrinsic variability of traits and to trade-offs between the costs and benefits of different trait levels. A high level of anxiety could be positive for humans living in unstable environments, while it could be detrimental for those living in a stable environment. As the human species colonized various environments during its migration over the world, it follows that there is no optimal level of anxiety and that this trait will have fluctuated between individuals as a function of circumstances. Balancing selection is another mechanism that could explain the diversity of personality. Balancing selection occurs when two alternative strategies are viable. For instance, Holtzman and Strube hypothesize that narcissistic strategies were maintained over generations due to the viability of the short-term mating strategy. In particular, these authors suggest that there may have been frequency selection for short-term mating among a population of people who were largely engaged in long-term relationships. There is a frequency effect with this personality, because short-term mating strategy provides an advantage only when at low frequency in the population.

Of course, the most important factor that explains the diversity of personality is the extreme plasticity of the human mind to environmental conditions, notably early childhood experience. The idea is that humans are equipped with cognitive ability to predict the style of interpersonal life strategies they should adopt according to the conditions they experience in childhood. For instance, a deprived and unstable childhood associated with an absent father provides keys to the child indicative of an unstable environment leading to the development of a risk-taking strategy, favouring short-term relationships based on seduction rather than enduring relationships based on intimacy. In contrast, a stable childhood would induce a personality compatible with a slow life-history strategy (traits that favour reproduction at late and optimal time points). Other factors such as the position of the child among the siblings seems to have an influence on their personality, with the idea that close siblings tend to differentiate in order to occupy a different niche (Sulloway, 2011; Damian and Roberts, 2015).

Another way to explain the origin and diversity of personalities relates to the fact that physical attributes can lead individuals to pursue different interpersonal strategies. It is quite obvious that such strategies will differ depending on the individual's physical appearance. Let's imagine a physically strong boy; in the early stages of his life he will elicit specific reactions from his entourage, such as admiration for his strength. He will also experience the fact that he can obtain a desirable toy in the playground without much effort. If, in addition, the child is physically attractive, he will easily receive more positive feedback when initiating a relationship. This early life experience might lead to the development of personality traits such as extroversion or dominance (Lukaszewski and Roney, 2015). If physical traits such as strength and attractiveness were heritable, then personality traits such as extroversion and dominance would be heritable in turn. Evolutionary psychologist experts refer to reactive heritability because there is some appearance of heritability for a

personality trait, whereas in fact only the physical attributes (which cause the personality) are heritable (Lukaszewski, 2011). This reactive heritability provides an additional explanation for the diversity of personalities observed in human populations.

To return to the topic of this essay, little is still known about the factors that influence narcissism. We have seen above how narcissism is influenced by environmental conditions such as parenting. But parenting may not be sufficient to explain narcissism. It is likely that complex genetic factors could predispose given children to develop high narcissism under given parenting modes. This would explain the heritability observed for this trait. A different and non-mutually exclusive hypothesis is linked to the notion of reactive heritability discussed above. We have previously mentioned physical traits associated with dominance. One question is whether narcissism is associated with physical attributes. Studies have shown that narcissists tend to be strong, to move in a smooth way indicative of athleticism, and tend to have a facial appearance with a larger head, thinner lips, a thicker jaw and fuller brows in men (reviewed in Holtzman and Donnellan, 2015). There is also a small yet reliable correlation between narcissism and attractiveness, but this difference vanishes when the test is performed under controlled conditions (Holtzman and Strube, 2013). This suggests that the attractiveness is not due to the narcissists' inherent beauty but to their tendency to adopt a flattering style and beautifying themselves by grooming. The existence of a few physical traits associated with narcissism suggests that reactive heritability could explain a part of the origin of this personality. For further information on evolutionary models discussing the origin of narcissism, see Holtzman and Donnellan, 2015.

Chapter 13

Social Dominance Hierarchy in the Laboratory

In the last chapters, we investigated the underlying cause of the narcissistic personality by reviewing observations and hypotheses from traditional and evolutionary psychology. This allows us to consider the roots of this personality type and its complexity. Both the social personality approach that focuses on personality traits and attitudes, and the evolutionary psychology approach that attempts to decipher its biological origin complement each other very well. The desire to get ahead rather than along, aggressivity as soon as status is challenged, selective socialization with the most influential individuals and entitlement are traits that relate more to the dominance axis. The capacity to seduce, the inflated self that increases confidence, perpetual dissatisfaction and a lack of empathy are traits that relate more to the short-term mating axis.

Scientists are probably right when they equate a reputed professor with narcissistic traits to an 'alpha male' (see Figure 15). This captures the sense of his power underpinned by his narcissistic traits. There is no reason why scientists should escape the influence of the dominance hierarchy that rules relationships among other humans. As seen above, social hierarchy is supported by the existence of cognitive biases. This has led us to postulate that a significant fraction of

Figure 15: The alpha male

People high in narcissism often exhibit features related to the alpha male, such as a muscular mesomorph shape, an arrogant and cold look, a great sense of self-importance and an attraction to the media. Sometimes they are also surrounded by an attractive entourage. Like a king followed by his court, they drive the field by determining the fashion of the moment. Their narcissistic traits signal their 'special status' and 'importance' even outside of their own field. They continually need to move and hide their somewhat standard life, which is revealed as soon as the mask is removed. Shown above is an emblematic figure of our time, the fashion designer Karl Lagerfeld. Arnaud Maillard wrote about Lagerfeld 'He needs an eternity to get ready in the morning. He takes photos of himself at every photo shoot and puts them everywhere. He surrounds himself with a kind of royal court; nobody disagrees with him. Wherever he goes, there is Pepsi-Cola in a Baccarat crystal glass waiting for him and it gets replaced every 30 minutes. It's like the 18th century.' (Maillard, 2007; Sandberg, 2009). Credit: © Corbis

the N-drive is an evolutionary legacy of social dominance provided by narcissistic traits. This simply reflects the fact that the voice of dominant people is louder and more convincing than that of a subordinate, although the message is the same. It is interesting to note that some of these cognitive biases tend to protect higher-ranking, but not lower-ranking people from our criticism.

Of course, an imperfect hierarchy could be seen as better than anarchy. This is exemplified by the fall of many dictators who have often had even worse successors. In the context of science, this was illustrated in the first part of this book when describing the fight for the succession of the grand mandarin, when the institute swings unstably due to the battles of egos. This reminds us of the positive importance of hierarchy and status cognition for estimating rank and avoiding costly confrontations. A good dictator or king, even largely incapable, may be preferable to a wild fight between aggressive coalitions.

Narcissism and the Matthew effect

In an influential article on reward published in 1968, Robert Merton defined the Matthew effect as 'the accruing of greater increments of recognition for particular scientific contributions to scientists of greater repute and the withholding of such recognition from scientists who have not yet made their mark' (Merton, 1968). He named it after the gospel of Matthew, which can be simply translated as the 'rich get richer and the poor get poorer'. Examples are numerous. With an equal contribution, an already reputed scientist gets more credit for a discovery than an unknown one. Another illustration is that while discoveries are usually complex processes involving many protagonists, all credit goes usually to one or a few individuals.

The existence of the Matthew effect suggests that beyond all rational logic, there are tacit factors, which distort an objective

appreciation of scientific achievements. At the end of his analysis, Merton recognized the role of personality. He wrote:

> Certain aspects of their character [of great scientists] also play a part, these men are of exceptional ego strength. Their self-assurance finds varied expression with the context of science . . . the [Nobel Prize] laureates exhibit a distinct self-assurance which at the extreme can be loosely described as an attractive arrogance. (Merton, 1968)

The ego strength is perceived quite positively in Merton's article, underlying the beneficial effect of high ego that we have discussed previously. Our analysis goes further by recognizing the influence of network, self-fascination, visibility and signals that influence perceived competence as factors for rising in the hierarchy. We can speculate that narcissism as a visible personality, with dominance as its underlying biological counterpart, contributes to the Matthew effect and the establishment of a steeper hierarchy in science. Scientists, as do all humans, tend to exaggerate the achievement of their leaders, and narcissism, a personality type associated with ranking and specialness, is a factor that increases differences. Thus, our analysis traces the roots of interactions within the scientific community from the biology of humans. It is actually the influence of all these tacit factors, which melt away with the objectivity of science, which make definite judgments in science so difficult. Similarly to the Matthew effect in science, we will speculate in the next chapter how a rise of narcissism could explain the increase of inequality observed in our society in the last decades.

Can we move away from our biological heritage?

> Studies on leadership have shown that personality is a key determining factor of unethical and ineffective leadership.

> More specifically, the one construct that researchers have continually linked to a leader's proclivity to behave ineffectively and unethically is narcissism. (Blair et al., 2008)

> One of the most serious threats to society today is a lack of moral leadership. (From Mitchell, 1993, quoted in Blair et al., 2008)

An important question that we will address now is whether we are condemned to this situation by our biological nature? If narcissism is the trait associated with dominance and this very narcissism correlates with a higher capacity to convince others and to establish powerful reciprocal alliances, then how can we avoid being subjugated by narcissists? All the more if our own cognitive bias favours this type of dominance? Can we move on to a post-narcissistic society? Is it possible to be better at choosing decent political leaders instead of the most charismatic ones who, once elected, end up entitled and preoccupied with their own personal agenda and by keeping social attention focused on themselves?

As a concluding remark in her chapter on dominance, psychologist Denise Cummins underlines the difficulty of combatting the influence of social dominance in human society, because it is part of our innate heritage (Cummins, 2005). She suggests that one way to limit the malevolence associated with dominance hierarchies is to place ethical people in top positions, who would then exert their dominance by taking care of others instead of themselves. She also points to the importance of having a cultural framework value that counteracts a Darwinian vision of human society.

It is interesting that scientists, despite their knowledge of many biological processes, are in the same boat and are no better off than ordinary people in this regard. It seems to me that a deeper understanding of the narcissistic character could provide us with the tools to correct our vision and to better select our leaders, which

would definitely improve our society. Social personality experts associate narcissism with overevaluation due to the inflated self of the narcissist. A bottom-up evaluation might relegate many narcissistic scientists to their proper place, especially once account has been taken of the cost of their research. As personality traits are relatively stable over time, the key point is to detect and roughly quantify narcissism, which appears as a kind of multiplication factor. Indeed, if narcissistic persons have an advantage, this is largely due to their capacity to convince others – their high N-drive that tacitly signals their importance. If we could roughly estimate the value of their N-drive, we might get a better assessment of their real value once the speculative bubbles created by their inflated selves have dissipated. Some narcissistic traits can easily be spotted and estimated. It takes less than five minutes examining a Facebook profile to assess the narcissistic trends of a person by analysing, for instance, the number of friends (usually inflated), photographs with beautiful people of the opposite sex, advantageous poses or the frequent use of 'I' (Buffardi and Campbell, 2008). As we are usually aware of many signs associated with narcissism, these traits should alarm us to the risk of high narcissism, and we should take this into consideration when selecting our leaders. This might prevent excessive fascination and provide a better chance for selecting enduring scientists with easier characters. Such selections are always difficult decisions, as we know that narcissism facilitates success and visibility in the short-term, which are unfortunately exactly what our politicians or university leaders want. The situation is even more complex because science does not thrive on an isolated island but is interconnected with other economic and social actors. The N-drive is an important element that facilitates the communication between these worlds. In this respect, journalism and communication media are mostly under the influence of the N-drive when considering science. On a more positive note, selecting scientists lower on the narcissism scale offers many advantages: better conviviality and collegiality, cooperation

instead of networking and more participation in communal duties. Nevertheless, the best way to counteract narcissism at its root is to influence the implicit framework of our society. If generosity and attention to the other are the most cherished values of a society, narcissists should orient their life towards these dimensions to get admiration from the others. This is far from easy and this change at the societal level will be discussed in the next chapter. Thus, the question of whether we can move to a post-narcissistic society remains open. A reasonable hope would be that we can at least decrease the level of narcissism and some of its deleterious effects.

Part IV

The Impact of the Rise in Narcissism on Society and Science

Chapter 14

On the Rise of Narcissism in Western Society

Introduction

> Narcissism is the fast food of the soul. It tastes great in the short term, has negative, even dire, consequences in the long term, and continues to have widespread appeal. (Twenge and Campbell, 2009, 259)

In 2009, Campbell and Twenge, two US psychologists, published *The Narcissism Epidemic* analysing the spread of narcissism and its damaging consequences in American society. The authors use experimental and historical data to show that the narcissism score of Americans has never been so high (Twenge and Campbell, 2009). They were not the first to write on the topic. In 1976, the American journalist Tom Wolfe called the 70s 'the Me decade'; he postulated that economic prosperity leads to an excessive celebration of individualism and self-focus. In 1979, Christopher Lasch published his famous book *The Culture of Narcissism* in which he describes the American society as entitled, individualistic and decadent. Lasch was probably one of the first to capture the multiple and insidious consequences of the rise of narcissism on society, but his book could not integrate the recent research on this personality trait (Lasch, 2006).

Previously, Twenge had already written her popular *Generation Me*, which focused on narcissism in the younger, millennium generation (Twenge, 2006).

Based on our familiarity with narcissistic personality traits, we can now discuss the possible increase in narcissism in Western society. This social change may look less threatening than, for instance, global warning, the decrease of biodiversity on our planet, recurring international tension in some corners of the world or the recent economic crisis, but in some ways a rise in narcissism could impede many initiatives dealing with these issues because narcissists focus on short-term rather than long-term gains. In addition, narcissism may create damage without people realizing what really caused it. At first, it might look a little surprising to talk about an increase in narcissism. Human personalities are by nature difficult to grasp and even more to quantify. How could we detect such quantitative change over time? Would this question not first bring up the eternal tension between the ancient and the modern? After all, complaining about the younger generation already existed in Ancient Greece and is a recurrent object of discussion through history. The proposed rise in narcissism could just be an issue of old parents complaining about the young. Nevertheless, we will still try to analyse the hypothesis of a rise of narcissism in Western society and explore its consequences.

There are several reasons why an increase in some character traits could be more evident nowadays than a few decades ago. First, our society seems to be evolving at an unprecedented rhythm, which might put us in a better position to see a change in personality. A second point is that the mixing of various populations that brings together people differing both in ethnicity and culture could improve our vision of human personality and its diversity: a privilege that has so far been limited to anthropologists and wide travellers. Thus, the human heterogeneity that characterizes our present time might make us more receptive to this change. Finally, our knowledge of personality and psychology has significantly increased and this also contributes to our sensitivity towards such changes.

Earlier we discussed how parenting has a strong impact on personality and how indulgent parenting may be a risk factor for narcissism. The tremendous changes in parenting during the last decades immediately raise questions about a simultaneous change in personalities. We have moved from large families to smaller ones, from religious obedience and sacrifice for the community to an emphasis on individuality and personal achievements; in this context, a change in narcissism could make sense. In this section, we will move away from science to discuss the social consequences of an increase in narcissism.

General consequences of a rise in narcissism

If we take seriously the hypothesis from evolutionary psychology that conceptualizes short-term mating strategies and dominance as the underlying evolutionary basis of narcissism, we can try to speculate on the multiple consequences of a general rise in narcissism. What would happen if everybody in a society behaved more strategically to achieve their goals and to get ahead rather than along? Let's imagine a society in which the social dominance hierarchy is more marked (the 'dominant' are more 'dominant') and short-term mating strategies are no longer the exception.

Let us then speculate what might be the consequence of a rise in narcissism for society. This could be translated into:

- An increased race for power and resources. An increased emphasis on crude materialism, fashion and other displays that signal high status.
- An increased importance of physical beauty with the use of cosmetic surgery and increased time spent on self-grooming, more social pressures to be slim and well dressed.
- A fascination for popular narcissists with high N-drives such as self-centred football players, celebrities or populist politicians.

- An obsession with being viewed, being centre stage, mirrored by online social networking. Our attention becomes restricted to ourselves or to strategic popular individuals; weaker members of society become invisible or seen as a costly waste.
- Self-absorption that reduces curiosity towards the external world and other individuals.[1]
- An increase in inequality, with the rich who find it easy to justify their excessive wealth by credibly postulating their specialness.
- Increased differences in rank, with an increase in xenophobia and possibly racism. More difficulties for different communities to live together.
- An increased level of hierarchy with restricted social mobility in the absence of networks.

1 Narcissism has a complex relationship with curiosity. When a pupil high in narcissism is good at school and gets recognition from his peers, he will be motivated to succeed and work hard. In contrast, narcissist students that cannot excel rapidly lose their motivation and find another way to get ahead. The situation is complicated by the development of narcissism that peaks in teenagers and young adults, a critical age for scholastic success. An increase in self-absorption and feelings of specialness, notably for an adolescent, would reduce the curiosity and discipline required for success. The better performance of East Asian and females versus males in schools could be explained by the fact that each former group is generally less narcissistic. They work more regularly, not just at the last minute. Professors sometimes complain about the lack of motivation and intellectual curiosity of the new generation of students. This could be explained if we consider that they are indeed a bit more narcissistic. They feel entitled to success. Eager to get into top universities, they seem to work simply in order to get the required credits. Highly communicative, they engage themselves only when there is a direct reward. The professors have to go to them to capture their attention, otherwise they will be distracted and self absorbed.

- Decreased parenting quality as a consequence of frequent ruptures of family bonds due to the unavoidable short-term mating attraction.[2]
- An increase in 'playing the game' and 'keeping my options open' conceptions of love, resulting in an early loss of trust and difficulties in imagining long-term and intimate bonds.
- An increasing need for individuality as evidenced by original first name, tattoos, piercing or a special diet.

The reader may notice that most of these aspects are not really hypothetical, but actually more or less commonplace in our modern society. These developments lead us towards a society with less trust, a lower sense of community and more inequalities. While there may also be positive consequences with more opportunities for a few people, globally, an increase in narcissism will probably benefit only the most self-centred individuals. And the consequences could be much more serious. Suffice it to think about all the people relegated to the second division, left to consume the television drama of celebrities, all focused on their self-celebration.

Social scientists use the interesting concept of social capital to refer to salutary features of a community that transcend the level of individuals or individual networks (Sapolsky, 2004). These features reflect trust, reciprocity, lack of hostility and cynicism, group participation and a collective sense of efficacy. It does not take long to realize

2 This short-term mating attraction refers to the desire for novelty and the difficulty of maintaining enduring bonds. An increase in narcissism leads to a decreased sense of sacrifice for ideals, such as family, in order to favour our selfish interests. Both men and women could appear distracted and less committed to their partners or children, as they look for a more exciting partner. Narcissism is linked to overevaluation with the desire to find better and fresher. Nevertheless, many of these ruptures usually aggravate the situation: less money for the family, bad parenting, less time for others because the parents are self-absorbed by their complex family life, children are self-absorbed with their teenager malaise, and other humans have to listen to their problems!

that high narcissism destroys the level of social capital by decreasing trust at the work place or in affiliate domains. This is a worry because a large body of data shows that the links between income inequality, poor health, and high mortality rates are mediated predominately by the decline in social capital (Sapolsky, 2004).

Social dominance hierarchy in primates, including humans, is largely established by the capacity of dominant individuals to induce psychological stress in lower rank individuals (Buss, 2012). And indeed, a powerful professor is usually quite good at pressuring his lab members to be competitive. Thus, a more marked social dominance hierarchy consequence of a rise in narcissism would result in a society perceived as being more stressful. A vast body of research causatively associates psychological stress with a variety of concrete physiological disorders, affecting immune functions, digestion, sexuality and brain functions. Thus, this rise in narcissism could explain the sharp rise in so-called Western diseases, such as obesity, food intolerance and eating disorders (not to mention psychological ones). Many of these diseases affect the gut, an organ highly sensitive to stress, sometimes called the 'second brain'. Eating disorders and obesity could therefore be seen as secondary consequences of a society perceived as being too competitive. These diseases could particularly affect individuals whose personality instils a feeling of entitlement (i.e., are more sensitive to social dominance hierarchy by their personality), but whom society relegates to a lower rank. Thus, I expect that this will especially affect individuals high in the vulnerable form of narcissism, who are sensitive to the regard of others and who have a fragile self-esteem. Neuroticism (i.e., anxiety, impulsivity, sensitivity to stress), a personality dimension of vulnerable narcissism, is a robust correlate and predictor of many different mental and physical health disorders as well as medically unfounded somatic complaints (Lahey, 2009).

Many of these ailments affect only a fraction of the population and are often associated with given personality types (Touyz et al., 2008, 26). When we associate a psychosomatic disease with a

psychological problem, we forget that our personalities are part of ourselves. Finally, many intrinsic disorders such as food intolerance, eczemas and allergies could be another consequence of the rise of narcissism because they increase the feeling of specialness and set individuals apart from the group. They are also a way of getting attention from our relatives and of protecting our self-esteem by externalizing our difficulties. In a narcissism-oriented society, failures are much more difficult to accept, because they directly challenge our qualities and our value compared to others.

These possible symptoms should ring a bell to us scientists. If materialism and a Darwinian and competitive framework are taking over in our society, it cannot be excluded that the benefit of wealth and technology could be overcome by a concomitant somatization of this competitive framework, lack of trust and poorer human relationships. It is in this perspective that it is worth taking into account the message of Twenge and Campbell on the narcissism epidemic in the United States.

The narcissism epidemic: Campbell and Twenge's message

'We did not have to look very hard to find it. It was everywhere' are among the very first words of Campbell and Twenge's *The Narcissism Epidemic* (Twenge and Campbell, 2009). The first part of the book presents numbers and facts supporting a rise in narcissism. For example, a survey data from 37,000 college students indicates that narcissistic personality traits rose significantly from the 1980s to the present, and that the shift was especially pronounced in women. This rise in narcissistic traits has accelerated in the last few decades. It is important to note that these authors have the same definition of the word 'narcissist' as used in this book: someone who is high on the narcissism scale, not someone diagnosed with

narcissistic personality disorders. The symptoms deriving from a rise in narcissism are multiple: materialism, vanity, a sense of specialness, antisocial behaviour, exaggerated overconfidence and a strong sense of entitlement. Campbell and Twenge claim that American culture actively promotes narcissism through its promotion of materialism: 'Narcissism is all about buying and using products that confer status and importance – expensive cars, jewellery, clothing, a nice house or anything else that displays status, power and sophistication (160).'

Materialism is just one of the many symptoms of the narcissism epidemic, but there are others. Vanity drives narcissists to seek perceived improvements in their appearance as a way of gaining status and attention from others. The relationship between Americans and plastic surgery is a good indicator of the current trend towards vanity; the number of plastic surgery procedures in 2007 was five times what it was in 1997. Botox injections, used to fight ageing, have increased an amazing 42-fold in the same period. Another easily observable symptom of the epidemic is the increase in the desire to be special, while actually following the lead of celebrity narcissists. It begins early in life, when parents choose a name for their newborn baby. They are more likely to pick something unique now than in 1946. According to Campbell and Twenge, 2008 was the year with the most unique names (the book was published in 2009), 223 babies in California were named Unique, Uneek, Unequee, etc.! The rise in narcissism also has some serious consequences for civic behaviour; the level of aggression among teenagers, for example, is increasing, and some of this is filmed and ends up on YouTube, giving the perpetrators their short moment of fame. Narcissism seems to be a significant risk factor for incivility and aggressive behaviour, in part because narcissists react more violently than normal people when their qualities are insulted. As the authors point out, narcissism does not usually account for violent crimes; the latter are instead associated with antisocial personality disorder and psychopathy, two cousins of narcissism. But they affirm that 'narcissism is linked to violent crime

in certain contexts: when there is the possibility for acquiring fame, and when there is an ego threat or rejection' (200). This seems to be the case for aggression videos, university massacres and possibly dictatorship crimes:

> Consider the mass murderers of history, such as Hitler, Pol-Pot, Saddam Hussein or Stalin. Do they strike you as possessing low self-esteem? No, they were so confident in themselves and their beliefs that they killed millions of people. Their narcissism allowed them to disregard the most basic rights of others. (196)

We can also observe a recent increase in white-collar crime; this may be related to the feeling of entitlement of the narcissists in charge – rules are made for normal people, not for special people like them.

Another symptom of this rise in narcissism is in the domain of human relationships at the workplace or at home.

> It was all about being exciting, fun and novel [212] . . . This mix of ego feeding and inter-changeability leads to all sorts of nasty relationship behaviours. Much of narcissists' behaviour in relationships is game playing. They are deceptive and dishonest; they signal commitment at one time and then pull away the next; they will play people off against one another, and they will avoid real commitment. (215)

Game playing also has the benefit of allowing freedom by keeping one's options open. This type of behaviour is also observed in companies, where narcissists might change jobs just as easily.

> Unfortunately, with relationships – especially romantic relationships, but also friendships and even in picking CEOs – people have a major problem with selection. We really want two things from relationships: the sizzle, the fun, the exciting, confident, charismatic outgoing and magic part, and the substance, the commitment, caring and teamwork part.

> Narcissist's secret to success is that they deliver the sizzle up front, but fail to deliver the substance. (217)

Thus, the main consequence of high narcissism is to destroy trust in a relationship. Narcissism is linked to short-term seduction and the use of the other for self-enhancement purpose. People who suffer from a narcissist suffer because this type of relationship utterly destroys their trust in others. This decrease in trust is especially strong in the romantic domain when short-term seduction and a game-playing concept of love are becoming the norm, but a general diminution in trust can also be observed in the workplace.

The final symptom and consequence of this rise of narcissism is entitlement, as illustrated by the subtitle of *The Narcissism Epidemic*: 'Living in the age of entitlement.' But what exactly is entitlement? The authors define it as a state of mind in which someone thinks that others needs are just not as important as their own needs', or put differently, 'the persuasive belief that one deserves special treatment, success and more material things'(230–5). It is one of the most damaging components of narcissism for others: 'When narcissists feel entitled to special treatment, someone else invariably suffers.' Entitlement may work for some individuals – sometimes demanding students get their grades changed even when they don't deserve it – but it has terrible consequences when everyone in a society feels a sense of entitlement. At work, it is mostly seen with employees who want more pay, less work, more flexible hours, an on-site gym and so on. It impacts our planet; entitled people think it is their right to take more from the environment, whether it is fish, wood or oil. Some might think that certain jobs are beneath them.

The causes of this rise in narcissism

After presenting facts and symptoms, Campbell and Twenge proceed to search for the root causes of this epidemic. They identify four of them (Twenge and Campbell, 2009).

The first and main cause of the increase in narcissism in American society is the way parenting has evolved. Parents once wanted to be figures of authority, not their child's friends. The relationship has evolved and parents now want to please their children, letting them have what they desire, when they desire it. According to a nationwide study, parents' valuing of obedience in their children has dropped since the 1960s while the value of being well liked has risen. Twenge and Campbell put most of the responsibility for the epidemic on the self-esteem movement, which has been enormously influential in the spheres of popular psychology and education in the US. The school system teaches children that they are special and unique in order to increase their self-esteem, supposedly making them better individuals in society. But self-esteem leads to narcissism, and narcissism leads to caring less for others. 'Telling a child she is special sets her apart and creates disconnection – a recipe for narcissism' (192).

The second reason for the rise of narcissism identified in *The Narcissism Epidemic* is the increasing attention paid to celebrities by the media. As mentioned earlier 31% of high school US students expect to become famous someday. This becomes a problem because our celebrities are extreme narcissists, such as Paris Hilton, who is 'famous for being famous'. As the authors put it: 'Americans are obsessed with people who are obsessed with themselves' (298). We can see it almost every day by turning on our televisions – many celebrity shows are based on drama provided by self-absorbed characters engaged in confrontational behaviour or self-aggrandizement.

The third reason for the rise of narcissism is the growing popularity of social networking sites, which supposedly act as positive feedback loops for self-esteem. 'In her eye-opening book *Generation MySpace*, high school teacher Candice Kesley lists four messages young people absorb from social networking sites, like MySpace and Facebook: i) I must be entertaining all the time; ii) If you got it, Flaunt it; iii) Success means being a consumer; and, iv) Happiness is a glamorous adult (with adulthood defined primarily in terms of sexuality)'(108).

These sites put a lot of emphasis on communication through images and self-description; both can be falsified by making ourselves look more attractive or cooler. It also gives everybody a space for expression, with potentially much larger global audiences on platforms like Twitter and YouTube, giving a sense of importance.

The last reason is the ability to live on credit, spending more than you earn: 'Take a culture that promotes self-admiration and material goods, add the ability to realize this self-admiration through buying things you can't really afford, and many people live the narcissistic illusion that they are wealthy, successful, and special' (123).

The cure for narcissism

A significant part of the Campbell and Twenge book is about the solution to this epidemic – can we cure narcissism? Studies have shown that the narcissism personality score tends to be pretty stable over time, which probably leaves little hope for treatment on an individual level. In addition, grandiose narcissists feel good about themselves, which creates little, if any, incentive to change; the people surrounding the narcissists are usually the ones who suffer the most. Therefore, the change will probably be on a societal level, with a lot of cultural changes – from the way we raise children to the attention we pay to celebrities. The authors even provide some advice about how to educate children:

> 'Don't give your child too much power. He will also learn how to compromise for the good of others, a useful skill in friendship and relationships.' 'Carefully consider the message you are sending to your children about competition and winning.' 'Think twice before you tell your kid something that announces how special or great he is.' 'Young people should be encouraged to do some difficult work in order to learn humility, compassion, the link between work and pay, and the value of the dollar.'

The researchers suggest the use of certain qualities: humility, self-compassion and mindfulness, which is the awareness of the present moment – the thought, the feeling and the physical experience – without negative judgment (284–5). Practising mindfulness keeps the self from entering into every experience in your life. Not only do you see the world more as it is, but the practice has clear benefits for your relationships, reducing conflict and keeping it from getting out of hand. Another treatment is also to acknowledge connection and commonalities with others. As a bonus, this feeling of gratitude increases happiness. The final advice the two authors give us is very simple: 'Avoid relationships with narcissistic individuals as much as you can . . . Keep your radar active: if someone seems highly charismatic, charming, or confident, take some time before entering into relations with them' (225).

We will conclude with a quote from the book:

> Think about where we want to go as a culture and who you want to be as a person. We can take the road of narcissism – the road that got us here in the first place. Along this road, we see the signs of greed, self-centeredness, shallow relationships, vanity, social isolation, phony economics, bailouts and blame. Or we can walk a different path, one way marked by responsibility for ourselves, our families and our communities. This road values the things that bring us joy without harming others, such as close relationships, strong communities, hard work and passions or hobbies. (xii)

Box 8: Myths and issues with narcissism

In their book, Twenge and Campbell take time to destroy some of the myths associated with narcissism.

Myth 1: Narcissism correlates with high self-esteem therefore narcissism is good. But narcissism is not just self-esteem; narcissists think they are smarter, better looking and more important than others. Yet they

rarely think about being more moral, more caring or more compassionate than others, unless the moment offers this as an opportunity for self-aggrandizement. Narcissists don't brag about how they are the nicest, but rather about how they are winners or how hot they are. A person high in self-esteem could take advantage of his/her self-confidence to take care of others. This self-focus distinguishes high self-esteem from narcissism.

Myth 2: Many people believe that narcissists, deep down, are insecure, have low self-esteem and hate themselves; narcissism could be a mask to hide those feelings (26). However, there is no evidence that extroverted grandiose narcissists are insecure underneath. They like themselves just fine, and even more than the average person. However, vulnerable narcissists do have occasional bouts of low self-esteem and may end up going into therapy.

Myth 3: Narcissists are successful in our present world. Many parents who try to transmit a sense of community to their children are afraid that their children may not be sufficiently ego-centred to succeed nowadays. They see their child as too naive, not self-assured or not manipulative enough to find their way in a world high in narcissism. Twenge and Campbell suggest that we should go further and deeper than the superficial happiness of fun and sexy people: just see how many of our celebrities are alcoholics or drug-dependent! Many people believe that narcissists are phenomenally successful because narcissists actively seek success. In fact, 'narcissism is a great predictor of imaginary success, but not of actual success' (43) and many fail and live poor lives. This is an example of what psychologists call the availability heuristic – one believes that something happens more often than it really does if one can recall it more easily. The authors point out that 'there is one exception to the rule that narcissism doesn't lead to success. Narcissists are good at individual – though not necessarily group – public performance. When a narcissist can receive public recognition and admiration for their performances, they try harder and do better' (47). This suggests that in fields like art and science with strong public recognition, narcissism could react positively to the motivation as discussed earlier.

The narcissism epidemic: Personal views

We often oscillate between two moods when we look at our present world. One is to be full of excitement about the progress in economics, ethics, life expectancy and increasing opportunities. The second is a diffuse feeling of worry, in face of a world so complex that it seems to escape us and that sidelines a significant number of individuals. This worry is sometimes increased by a feeling of exhaustion caused by the short-term mode of interaction that characterizes our present time and is associated with a diffuse sense of stress. The analysis of Twenge and Campbell should not be seen as a criticism directed against the younger generation nor against present society. As expected for psychologists, they simply have an empathic consideration for those who pay the price of this competitive and materialist society and try to offer some solutions. We should not forget that we, scientists, are in some way sheltered from this rise in narcissism because, as expressed by the authors, passion and hard work, two features of science, are protective because they allow us to focalize our attention outside of ourselves. This does not, however, prevent us from looking outside and seeing how a decrease in trust and decreased socialization impact on our society. It is probable that many of the narcissistic symptoms depicted above are not new, but that we are in a better situation to appreciate this change. After all, the fact that narcissism is affected by parenting could lead to a succession of historical cycles with increases and decreases in this trait.

The narcissism epidemic affects the United States more severely than Europe. As Twenge and Campbell put it, the traditional high self-esteem that characterizes Americans might have turned into narcissism. As Europeans, we perceive things as oversized when traveling in the US, be it the size of their houses, their cars or the food portions put on their plates. We also like the US because of the American tolerance to differences, their eccentricity and openness to novelty, when compared to the old continent. Those are some

of the good sides of higher narcissism. Europe is probably partially protected from this narcissism epidemic by its traditional cultures and the fact that inequalities between individuals are less marked than in the US. My personal intuition is that this rise in narcissism takes on a different flavour depending on the culture. An increased feeling of entitlement (to defend one's own interest rather than that of the community) and, one of its most insidious consequences, corruption are symptoms of higher narcissism that could affect certain susceptible countries, notably those on the Mediterranean.

One point worth analysing is to identify the roots of this rise in narcissism. As we have seen above, Twenge and Campbell provide four explanations: the first one is developmental, including permissive parenting and self-esteem–focused education; the second is the media culture of shallow celebrity; the third is the internet and social networking; the last is the availability of an easy bank credit to turn narcissistic dreams of status into reality. My personal analysis is that the last three explanations could probably be seen as secondary consequences of the rise of narcissism, and which in fact reinforce the vicious cycle by feeding narcissistic trends. Individuals high in narcissism tend to be more fascinated by N-drive individuals, take more time to self-promote themselves and live on credit because they are largely oriented toward success and less concerned by risk.

There are probably other explanations for an increase in narcissism: lower synchronization as a consequence of individualism (eating alone, absence of rhythm due to prolonged periods in front of the computer), affective rupture as a consequence of divorce and a decrease in socialization that usually would teach us the value of being together. The increased mobility in our society also makes the narcissistic strategy more sustainable, as a narcissist would have gained a bad reputation when confined to a village. Another related explanation for this rise in narcissism could be the decline of traditional religions[3] and notably religions with social intrusion

3 We refer here to *traditional* religions as opposed to i) individual spirituality,

that constrain social life by rites. In this line, on several occasions Twenge and Campbell point to the role of traditional religion for limiting narcissism:

> Many religious beliefs directly promote the reduction of narcissism (or related concepts like pride and selfishness), teaching a belief in something larger than the self, the idea that one should live according to certain rules that apply to everyone, and the value of a community of fellow believers. (245)

Later, they observe 'Overall, more traditional cultures that value family, duty and obligation are less narcissistic than more modern culture like the United States' (38). There are several reasons to suggest that traditional religions, notably those with a moralizing dimension, are particularly adapted to counteract narcissism. First an external referential such as God tends to reduce the importance of inter-comparison between humans, and the struggle for status appears futile compared to the pursuit of other ideals. Second, most religions have developed a compassionate approach towards the weak and the depressed, and encourage socialization, which is opposed to self-centredness. Experts in religions have identified a cluster of mechanisms – synchronous movement and music, self-regulation, and fictive kinship – that promote pro-social behaviour (Norenzhan, 2013, 114–7). While narcissism decreases trust, religions tend to increase trust among believers of the same religion. Finally, many moralizing religions have rules prohibiting

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which provides a mechanism to counteract our own ego but does not affect the framework of society and does not promote synchronization between individuals, and ii) sects and fundamentalism that could be seen as malicious forms of religiosity, which effectively promote synchronization but also encourage inter-group competition. The latter could be viewed as particularly well adapted to individuals high in the vulnerable form of narcissism as a mechanism for coping. The relationship between religion and narcissism is complex, and we suspect that on certain occasions (e.g., in minorities), religion affiliations could promote narcissism by increasing the feeling of specialness.

short-term mating and instead promote intimate and enduring human monogamy.

As social dominance hierarchy differs among our closely related primate species (Ellis, 1995), it cannot be excluded that human populations (and individuals within populations) differ slightly in their predisposition to narcissism. We could expect that religions with higher verticality and high intrusion in the social sphere would have been particularly well adapted to counteract narcissistic traits in populations with higher levels of basal narcissism. Thus, religions, which are more intrusive in the social sphere, historically would have provided a kind of 'social integument' counterbalancing most of the deleterious effects of narcissism. This would then have allowed the development of pro-sociality that characterizes human populations. Considerable sense of hospitality, sophisticated politeness rules and intense socialization could be seen as signs of culture in populations which are higher in basal narcissism, but constrained by this social integument. When the coverlid of religions is not as tight or when historical or social events affect parenting, then the development of machismo, corruption, mafia and fascination for high N-drive leaders could be viewed as an expression of narcissism in such populations. The US culture, based on a background of protestant religion, is prone to promoting individualism and personal liberties. This probably provides a light social integument, but which is no longer capable of playing a protective role, notably towards its minorities, resulting in the latter in a high frequency of single-parent families and obesity. The increase in the near-fanatic, religious fervour that characterizes the US today could be viewed as a natural regulatory mechanism in response to an unfavourable social situation, which could explain its prevalence among some ethnic groups in the USA. Such models suggest that this rise of narcissism could affect cultures and countries in different ways and could be particularly threatening to certain populations in some contexts.

Since modern science has often taken a stand against religion and more generally against cultural values it considers arbitrary, and because of the fact that technology tends to reduce the requirement for tight social bonds, scientists could be partially responsible for this rise in narcissism by promoting a more competitive and Darwinian framework. While our modernity provides a world full of opportunities, scientists should start to worry about the decrease of trust in our society. As Polanyi noted, science does not exist on an island exterior to our society. To thrive, science requires a society that sustains a number of ideals such as a sense of sacrifice, justice and freedom.

Chapter 15

Narcissism and Issues in Contemporary Life Sciences

A crisis in life sciences?

'The heart of Research is sick' (Garwood, 2011).

'The dilemma of the honest researcher' (Steneck, 2011).

'Misconduct is the main cause of life-sciences retractions' (Corbyn, 2012).

'Stanford researcher contends most medical research results are exaggerated' (Eggertson, 2013).

'Something rotten' (Jacobs, 2014).

As illustrated by the titles of these editorials, much concern has been expressed in recent years about misconduct, exaggeration and unfairness in molecular life sciences. Contemporary life sciences have seen increases in the following trends:

- An obsession for ranking and metrics;
- A self-centred view that dismisses all life science research that is not connected to human health;

- A lack of curiosity for science performed outside one's field;
- An increasing number of unreliable papers, biased peer reviewing, data manipulation and other misconducts;
- More and more complex organizational systems and regulations, which make the assessment of productivity or long-term quality difficult;
- Increased inequality with very rich laboratories often working on hyped topics while others experience difficulties in getting funding.

This is illustrated by the increasing number of articles and informal discussions at meetings dealing with misconduct and related issues. Feelings of inequality in science mirror the increasing inequalities in Western societies. But these issues could all well be indirect symptoms of the increase in narcissism. A rise in narcissism is also suggested by all the measures and training sessions set up in academia to promote communication skills and networking, which are strategies for capturing maximal attention and resources. The success of narcissistic scientists and the fact that many of them occupy strategic positions in academia have several consequences; the standard of science is becoming tailored to the nature of their personalities and this might not be good for all of us! Science may have become less interesting than it was in the old days, when we spent less time discussing incorrect papers, and networking and communication were less essential.

Let's take a moment to look at other reasonable alternatives to this hypothesis. We could assume that narcissism was always present in research at a rather constant level. Indeed, scientists with narcissistic traits have always been prevalent. Thus, the present situation might not have been caused by an increase of narcissism, but instead by the possibility that incivilities associated with narcissism are simply

more visible and less tolerated than before. As scientific progress accelerates, often in the manner of a rapid succession of fashionable topics, the narcissists' mode of action might have become more visible. Previously, the lifespan of a research field used to be far longer than that of its scientists and, as a consequence, scientists used to grow, develop and die in the same research context. Thus, the self-enhancement strategy of narcissistic scientists in the past might simply have gone unnoticed. Our increased sensitivity towards these personality issues offers another, more uplifting hypothesis. This means that the abuses associated with narcissism might simply be less well tolerated than before, due to a global rise in awareness in science and in our society in general. Misconduct, favouritism and even sexual abuse were indeed the mode of action of many researchers who dominated the scientific scene in the past. This is, at least officially, no longer tolerated.

We also cannot exclude the possibility that ethical issues in contemporary life sciences are not caused by a rise in narcissism, but rather by a change in the nature of narcissism moving from demanding intellectualism toward the shallow and short-lived 'bling-bling'. We should also be aware that today's science is characterized by its extreme competitiveness, which could in turn exacerbate nasty behaviour. Finally, contemporary science is very heterogeneous from an ethnic or cultural viewpoint. This raises the possibility that many implicit rules of regulation that used to function in more homogeneous cultural contexts now fail.

Yet a much simpler hypothesis is that all these issues in life sciences are, after all, an indirect consequence of a rise in narcissism in our society as a whole. A higher prevalence of students high in narcissism together with harsh selection by the system for the most narcissistic among them could logically result in an increase in average narcissism among professors. This could explain why our system is destabilized at its foundations; many implicit rules of regulation in science previously carried out by the community do not function anymore.

Life sciences may also be affected for other reasons. First, the standards defining them are largely issued from the United States, which, if one accepts Twenge and Campbell's assessment, ranks among the world's most narcissistic nations. The appeal of modern biology, its links with medicine (the 'MD' phenotype that has infiltrated other areas of biology) and the money invested in life sciences have made this field attractive to people who seek fame. The extreme competition present in life sciences has exacerbated strategies for success; scientists who oversell themselves in their early careers with a great capacity for seduction are generally the winners. The increase in communication (travel, e-mail) provides incredible opportunities for networkers and the development of other mutual versus communal benefits. In short, the hypothesis that the destabilization of scientific practice is caused by a global raise in narcissism seems reasonable and provides a simple explanation for many of the symptoms described above.

A rise in narcissism is of major concern because it affects the trust between members of a community. The scientific community can handle a certain proportion of cheaters, but it could be deeply affected if the feeling of the community as a whole is lost. A rise in narcissism could explain the feeling of injustice in science. The remaining, meticulous scientists might feel in many respects disadvantaged compared to these new rock star scientists. These classic scientists, close to experimental bench work and committed to teaching and the practice of science, become progressively sidelined. They would appreciate a less biased distribution of funding money, less competitiveness as well as less emphasis on communication and networking. Scientists who are good at thoroughly investigating difficult questions of research have clear difficulties surviving in this world of short-lived trends. The selfish attitude of some scientists who are good at networking and finding resources ends up forcing others to use the same tactics, leading to a sort of arms race.

Getting rid of the bad aspects of narcissism

The question then is how can we counterbalance this rise in narcissism in academia? How can we get rid of this excessive emphasis on networking? How can we stop the rise of inequalities in science and limit the predatory attitudes of some scientists, institutes and universities? Our present science organization is probably not fully equipped to deal with these issues. Limiting the consequences is not an easy task because the damages are at the meta-organization level and are insidiously paid for by the community.

It is important to note that creating new networks of excellence, new types of research centres, and even new types of journals are not the best answers for counterbalancing this rise in narcissism. It might even exacerbate the problem, especially if this type of strategy hijacks the ethical argument because it appears as a self-enhancement strategy by the initiators of the project. They criticize *Nature* and *Science*, only to set up their own journals, which often become another private club. Nevertheless, some of the recent initiatives in life sciences are also positively trying to solve the issues raised above. The hope is that after a period of transition, the system can reach a new equilibrium.

Let us next discuss in detail four ways of counteracting the damaging effect of an increase in narcissism. The first one is to understand narcissism and to recognize this personality trait and its implications in the context of science. The second is to strictly enforce the rules of good scientific practice and increase sanctions against misconduct, not only towards students and junior scientists, but also towards group leaders and professors. The third one is to deal with the current obsession with short-lived sensationalist research and to recover a truer understanding of what science is, by developing bottom-up approaches and new criteria to assess success in science. The goal would be to promote reliability, reproducibility as well as curiosity-driven research. The fourth and last one reinforces the val-

ues and affirms the primacy of the community over individuals. True scientific collaborations and mutual approaches to research must replace competitiveness and networking. Many of these measures require fundamental changes in science organization and its entire evaluation system.

Recognizing narcissistic traits in a scientific context

One of the main objectives of this book is to help scientists recognize this type of personality and its complexity. Many young students, who grew up in an environment where they could trust each other, are not necessarily prepared to deal with scientists high in narcissism. They perceive science as teamwork with an open sharing of information. Their naive view of science – seen as a temple of pure objectivity above the ignominy and baseness of the material world – doesn't really prepare them for the reality. Good at school, they fled the domain of politics, finance, business and sometimes even art, with the idea of finding in the scientific community something close to an ideal society. And it is true that science often offers great moments of conviviality in an international community; it sometimes resembles the idealized 'society of explorers' to which Polanyi refers. Young people often move to science with great expectations of an honest pursuit of intellectual challenges, but only too late do they realize that often what really matters for many professors and universities is, in fact, the race for short-term glory. Although scientific ideals and collegiality exert some control on the scientific community, science is a place where narcissists can operate with almost total freedom. To be a good scientist also means being able to distinguish those who tend to oversell their research from the scientists who may look a bit duller but who are much more reliable in the long-term. It also means realizing that many papers and techniques are currently overrated

and that it might be dangerous to take their findings as solid truth. One should also be careful when choosing his or her collaborators since those high in narcissism will insidiously take all the credit. To summarize, it is essential to resist short-term seduction. We have described previously how narcissism can be spotted, and factors that can be used to estimate N-drive; this can be used to reduce our fascination for their behaviour.

Unfortunately, the present system greatly favours narcissists, to the point that even bright people and hard workers may find the research environment too hostile. Perhaps they could hide behind a better-prepared (narcissistic) professor, or choose a niche away from the overrun trends, or reserve their passion for science as a hobby.

By taking into consideration the prevalence of this type of personality, managers of universities and scientific institutes could learn a lot from social-personality literature (Campbell et al., 2011). They would realize that the shallow goals of university leaders, who are obsessed by ranking and short-term performance, can be damaging for science. This illustrates the deleterious effect of narcissism at the meta-organizational level. Overselling science to the public can create huge expectations that cannot be fulfilled. They will learn that narcissistic people succeed better than others at job interviews and that the recruitment pipeline favours this type of personality, but once selected, these charismatic professors are much less interested in their communal duties.

We can change how we perceive our scientific superstars and underline their predatory attitude. Courses on networking may help certain types of scientists, but are damaging to science as such. They should be abolished or at least appropriately named 'How to prey on the community'.

Yet when implementing the change we should always keep in mind that narcissistic people are extremely sensitive to the rules and customs of our society. They will be the first to change, to promote ethics, and they will probably be the most successful at talking about it!

Box 9: Suffering from a highly narcissistic professor

The objective of this essay is not to discuss the painful experiences of all those (especially students) who have been burnt or exploited by a strongly narcissistic professor. Instead, they can meditate on the 'chocolate cake model of narcissism', which tries to explain the experience of having relationships with highly narcissistic individuals. It was created for romantic relationships but applies well to selecting leaders, employees or co-workers.

> Relationships with narcissistic individuals are like eating chocolate cake; they are appealing and exciting, and initially far better than relationships with non-narcissists. Over time, however, these exciting partners turn out to be dishonest, controlling, and not concerned with your interests; just like chocolate cake, which makes you feel sluggish, depressed and unhealthy 20 minutes after you eat it. In contrast, eating healthy food – picking a moral partner – doesn't have all the upfront excitement but results in a much better long-term outcome (Campbell, 2011).

Those who have lost four years on a PhD or who have just been scooped by a two-faced colleague stealing their own discovery will understand what this means. They paid the price for their own naivety. Young scientists with true generosity and idealism tend to project their own personality onto others and cannot imagine that it is actually possible to be self-centred in science, and even less so to be very successful at it. It is usually a painful experience to realize that their value as a scientist was only measured by their capacity to feed the ego of their professor, while their objective research performance counted for very little. Understanding narcissism can be very useful for tracking more decent leaders or partners, which may seem less attractive at first acquaintance but certainly offer more enduring and satisfying relationships. For those young scientists who suffer from a narcissistic boss right now, there is little hope that he will change. The high dependence of narcissists towards others and the need for admiration makes narcissistic individuals very difficult to handle. Below is some advice for those junior scientists who work with a group leader or professor high in this personality trait.

The best option is to become the 'protégé' and enter in the self-enhancement strategy of the professor, but this strategy is most likely to work out for those students who are narcissistic themselves or very successful. One important point is to distance yourself and to become strategic in the relationship. Otherwise, a considerable amount of time can be lost just in agitation. Therefore, there is no need to rush to complete all his requests, you'd be better waiting until the inflated bubbles deflate and the moment's passion has disappeared. Narcissistic individuals are extremely sensitive to rank and are less considerate to their subordinates. The best way to influence them is indirectly, by influencing more reachable colleagues of higher rank who will in turn be listened to by the narcissist. Strong narcissists can lie with high self-confidence and distort past events in their favour. They have this capacity to lie in a natural way because they do not actually consider themselves to be lying. It looks like they have a short-term memory, and they can convincingly and in all seriousness make opposing statements without feeling any sense of contradiction. This high capacity for adaptation and their double-faced personality or chameleon phenotype gives them a strong advantage when facing naive characters. This often confuses people and robs them of their arguments. A good strategy is to take very precise notes of what you do and keep a time-stamped track of conversations. This helps you to detect inconsistencies and also to reassure you that you were right. Ideally you should have trusted friends in the institute with whom you can be natural and spontaneous. They will help you to consolidate your judgment more objectively. You might realize that narcissistic individuals are always the focus of attention and the centre of discussion. Thus, you can set up a personal guideline: do not think or speak of him and his wrongdoing, unless it is absolutely necessary. There are probably many more interesting individuals around you who are worth getting to know and who do not continually need to be in the limelight.

In any case, psychology textbooks often recommend moving away, especially when the pain is too strong. In science most injustices are not repaired. This is unfortunately how the overall system functions.

Better control in science practice

> Self-control mechanisms are a myth in science to avoid any serious external control. I have studied all [scientific] fraud affairs precisely and in almost every case anonymous allegations coupled with mass media outrage – in most recent years with an interim period of outrage on the internet – were necessary before the institutions themselves agreed to take action. (Interview with Prof. Gerhard Fröhlich on scientific fraud, Fröhlich, 2011)

In a society that does not share a high level of mutual values, measures are required to prevent some of its members from committing illicit acts. The fight against road accidents is a perfect example; lower death and injury rates were obtained only by the very strict application of restrictive laws. This was due to the fact that many car drivers put others at risk – certainly not on purpose, but because they were overconfident, overestimating their driving capacity. In a similar vein, the rise of narcissism in science requires a change in the regulation of science with more severity against misconduct. The implicit communal rules that regulate many aspects of science (evaluation, selection of leaders) are no longer sufficient; the percentage of pushy charismatic scientists is simply too high. Furthermore, social dominance studies show the existence of cognitive bias that protects people high in the hierarchy (Cummins, 2005). This explains why powerful professors are often protected by their high-ranking colleagues and by the university, as illustrated by the citation from Gerhard Fröhlich. In fact, the higher you are in the hierarchy, the safer your position, regardless of the severity of the uncovered misconduct. But as biologists, we could take these cognitive biases into consideration and be much harsher against top scientists since they play a key role in setting the example. Instead, the current rules impose the heaviest punishments on students cheating in exams, while their professors rarely face any personal consequences when cheating in their research. Retrospective

analyses are the best tools we have at hand for tracing misconduct from the early career stages of anyone under scrutiny, and must be applied regardless of the current standing of the perpetrator.

An official overarching organization to control science practice

The lack of transparency together with the claimed objectivity of science provides an enormous advantage for narcissists. More transparency is required in all academic evaluations. As a general rule, the names of peer reviewers who evaluate research articles should either be public or at least accessible to an overarching organization upon suspicion of misconduct.

Retrospective analysis – a sort of 'clean hands operation' – would be the ideal way to detect the existence of hidden networks in science and to identify scientists who breach conflict of interest guidelines. For instance, we could repeat the results of the conflicting papers in a given field of research while, at the same time, having access to the peer review reports and the names of the reviewers. The good thing is that, due to rapid technological progress, we can easily reproduce and verify many past experimental results. This type of analysis can only be done by close experts, who understand the content of the papers. These experts could team up with their colleagues from social studies and psychology to better understand the scientific ecosystem. Their approach and results would be probably closer to the classic way of doing research. As scientists, we must to be open to criticism and learn from it, which would be inconvenient to the narcissistic professors, who by essence are extremely sensitive to it!

Finally, universities should include a statement of reproducibility when recruiting a new professor. Candidates would have to engage their responsibility on the validity of papers used for their assessment. If the results were found later to be ethically questionable or non-reproducible, their employment would be terminated. This

type of surveillance could be financially supported through penalties paid by universities each time one of their papers was retracted; it could be a way of repaying the costs inflicted on the community (Schneider, 2015).

A bottom-up evaluation agency

It is likely that top scientists will not fancy such measures. After all, the current system allows them to maintain their supremacy. They will keep claiming that science needs its secret evaluations, in the same way that bankers claim that bank secrecy is needed to protect clients and promote freedom – the truth is that it allows them to earn money by protecting their clients' money from its due taxation. Senior scientists will likely warn that washing dirty linen in public by revealing cases of misconduct could damage the general public's trust of science. Imagine the indignant reaction bankers would receive if they were to use this argument openly!

An alternative would be to develop an independent evaluation agency that could be forwarded allegations of misconduct or reports of papers containing non-reproducible results (sometimes called a 'consensually wrong paper' or a 'possibly correct paper, but unfortunately not in my lab'). This independent agency could investigate these allegations, first by assessing their legitimacy, then by probing members of the community from the bottom of scientific hierarchy upwards. Of course, the main issue is that even if we are aware of the misconduct of our professor, we also depend on him or her for our own career. The agency should be able to obtain information anonymously, from those who are leaving science or from courageous scientists (whistle-blowers). This agency could also determine the real productivity of a laboratory: classic indexes rarely monitor the real productivity of a professor. Lab members or close colleagues may have better judgment since they have seen, for example, students or postdocs leaving the laboratory without any publication. This agency

could be in charge of publishing a predator factor, which divides laboratory output (after subtracting manipulated or irreproducible research) by its cost (which could be approximated by the number of staff members). The traditional impact factor could also include wrong papers whose impact must be subtracted. Each scientist would then be characterized by two dimensions: an impact factor and a 'predator factor'.

Recovering a true understanding of science

Analysing scientific progress and discoveries

What is a great discovery? The currently valid answer is simply that great discoveries are those published in prestigious journals. The goal of science is therefore to publish in trophy journals, while the objective reliability of the paper becomes less relevant. While there are at least some sanctions for misconduct, the problem of irreproducibility is hardly ever dealt with. If the results of a great discovery of some years ago turn out to be unreliable, the scientist responsible is actually most welcome to churn out further discoveries in trophy journals, even if those may suffer the same fate later on.

Important discoveries are often seen as ground-breaking or breakthrough concepts. They are deemed to be visionary ideas of genius scientists, proven right in their own labs. Science textbooks do tend to portray science as a succession of 'Eureka' moments by lone individuals. In-depth analysis of discoveries by science historians reveals the underlying complexity of most discoveries. The question of what is a scientific discovery is important because funding agencies do ask us to perform breakthrough science. If they have a misconception of discoveries, this puts scientists on the wrong track. The reading of a scientific article doesn't tell us much about the path leading to a discovery and is more often a reconstruction to sell the story, rather than the truth. The real sources that initiated or influenced the work

are often masked or minimized. Instead, the reference list appears more as a way of feeding the egos of potential reviewers or strategic community members (for example, editorial board members). Consequently, it would be interesting to analyse how discoveries are really made by questioning all the participants, from the first authors to the last, and also include the ones who were not named. This would prevent the reconstruction of the story by the winner and underline the essential role of the community, counterbalancing the Matthew effect. If we use this bottom-up approach, we would realize that most true (i.e., reliable and reproducible!) discoveries were done in classic laboratories working in classic universities, and not in one of those elite institutes supposed to develop a new type of creative research but often simply good at consuming large amounts of money. But now with Internet we have the tools to provide a better account of how discoveries are really made, and scientists, not just influential members of prize juries, should contribute to this task.

On the importance of academic freedom

Many scientists commit themselves to solving social issues. Applied science is difficult, with a high chance of failure, and should be strongly supported. But the excessive emphasis on translational research (research with practical applications) can be very detrimental. When scientists look at their scientific problems only in the light of possible economic or clinical applications, this has a devastating effect on basic science because it subtly biases scientist's observations and interpretations. As a consequence, papers are now always twisted in order to show how they relate to a health problem or a patentable technology.

The main motivation for doing science is to address interesting questions. The translational emphasis is surreptitiously changing the standards of what is interesting and how science is done. Scientists are forced to lie or bend the truth using complex wording and strange

justifications in publications and grant applications. The observation that more and more scientific results cannot be reproduced by pharmaceutical companies could ruin the reputation of basic science and has already revealed overstatements and biased vision by scientists (SciELO, 2015). And we are not even talking about all the start-ups largely kept alive by continuous subsidies from universities, keen to promote their image of modernity. Here again, overconfident scientists have oversold their science and made unrealistic promises to politicians and the public. The public is not stupid and can understand the importance of pure basic science. People strive to understand our world and can think strategically, unlike so many university leaders, who dismiss basic science as outdated. We must therefore restore the value of real basic sciences and stop asking scientists to justify the motivation for their work with immediate practical applications.

In this context, we can take inspiration from the debate in the 1940s between Desmond Bernal and Michael Polanyi on the mode of organization of science (Pielke, 2014). Bernal (and others) suggested that the organization of science in England should take inspiration from the centrally planned system developed in the Soviet Union. The latter wanted to organize science to directly address society's aspirations. Polanyi reacted by explaining that individual scientists pursuing truth lead to more efficient social outcomes. Even as Russian genetic science collapsed under Lysenko's appointed leadership and Stalin's terror, Bernal maintained his fascination for Stalin. Academic freedom meant that England was one of the most creative countries during the second half of the twentieth century, even though it is possible that some of the discoveries did not directly benefit British society. For example, the discovery of monoclonal antibodies wasn't patented – but everybody in the world has benefited from it. But nowadays, by supporting only fashionable or applied science, some countries could lose their attractiveness and reputation. As scientists, we should fight against the short-term views of our governments,

but this only works if every scientist takes part. Unfortunately, it seems that most countries are more willing to garner awards and glory than to make any real effort. This illustrates again the tragedy of the commons associated with narcissism and the focus on short-term gain.

Acknowledge the role of the community

Let's consider Michael Polanyi's approach of science as a puzzle:

> Imagine that we are given the pieces of a very large jigsaw puzzle, and suppose that for some reason it is important that our giant puzzle be put together in the shortest possible time. . . . The only way the assistants can effectively co-operate, and surpass by far what any single one of them could do, is to let them work on putting the puzzle together in sight of the others so that every time a piece of it is fitted in by one helper, all the others will immediately watch out for the next step that becomes possible in consequence. Under this system, each helper will act on his own initiative, by responding to the latest achievements of the others, and the completion of their joint task will be great accelerated. We have here in a nutshell the way in which a series of independent initiatives are organized to a joint achievement by mutually adjusting themselves at every successive stage to the situation created by all the others who are acting likewise. Such self-co-ordination of independent initiatives leads to a joint result which is unpremeditated by any of those who bring it about.
> (Polanyi, 1962b)

This short text illustrates how Polanyi viewed academic freedom. For him, the coordination of individual activities without the intervention of any coordinating authority is the best way to increase knowledge. Progress is made by the adjustments of many members of the community. One of the main ways to counterbalance narcissism

is to better recognize the importance of connections between people and the collective nature of science. This goes against Niels Jerne's elitist vision of science that mostly reflected his own narcissism, not reality.

In their article, 'Is the Nobel Prize Good for Science?', Arturo Casedevall and Ferric Fang review the numerous controversies linked to Nobel Prize attribution. Their conclusions are clear:

> In this regard, the Nobel Prize epitomizes the winner-takes-all economics of credit allocation and distorts the history of science by personalizing discoveries that are truly made by groups of individuals. The limitation of the prize to only 3 individuals at a time when most scientific discovery is the result of collaborative and cooperative research is arguably the major cause of Nobel Prize controversies . . . Changing the Nobel Prize to more fairly allocate credit would reduce the potential for controversy and directly benefit the scientific enterprise by promoting the cooperation and collaboration of scientists within a field to reduce the negative consequences of competition between individual scientists.
> (Casadevall and Fang, 2013)

The Nobel Prize fits with the narcissistic vision of science peopled by heroes, many of whom are very self-centred (but who of course can turn into nice and ethical people once they have succeeded). Science requires many different skills, and it is regrettable that recognition often goes to the storytellers or the dominant males of the community. By taking into account the tacit dimension, we could also better highlight the other key roles and skills – experimenter, tool constructor, organizer of databases – that hugely contribute to the progress of science.

Moreover, it is also essential in these troubled times to put the spotlight on scientists who play a positive role at the community level. Along these lines, it is sad to see that the new Google-Facebook Breakthrough Prize follows the same narcissistic track as the Nobel

Prizes, minus the tradition. The prize-givers are not interested by the progress of science itself, but by the communication that surrounds it. Instead of acknowledging a few people, they could have chosen the dozens who were involved in a discovery, including the first and last authors – this would have revealed a much more colourful vision of science. If the hope of these lavish prizes is to make science careers more attractive, they are on the wrong track. Making science attractive means cultivating and defending ideals, not falling for the celebrity game.

Prizes and recognition are not the only instances where the community should be better acknowledged. It is also true for patents in applied research that usually end up in the hands of the last (and not necessarily the most important) link of a long chain. As previously mentioned, narcissists are good in the final sprint to get the trophy and at beating more classic researchers to the finishing line. With public performances, these are the only moments when narcissists perform better than non-narcissists. We should find a way to better re-distribute the benefits of science to the community. The patent system and prizes epitomize the winner-takes-all mentality of narcissists and does not reflect the reality. In fact, we should acknowledge that we have never been so dependent on others for what we do. The time of the lone genius is over, or actually, may never have existed. Instead we have an illusion, or at best a narcissistic reconstruction, and the important individuals may not be who we think they are.

Conclusions

Taken together, all the measures presented here could decrease some of the damaging consequences of the increase of narcissism in science. More knowledge of the narcissistic character might help us to select enduring leaders. Better controls of scientific practice could put a brake on the increase of unfairness and misconduct in science.

A bottom-up approach could also provide a better way to evaluate science and distribute resources. These measures would probably emphasise the importance of the community and the traditional way of doing research. There are many other measures dealing with external private funding (see Box 10) or communication that could also play positive roles. One of them is to reduce the inflated claims made by public relations staff working for universities and funding agencies and to instead promote an independent and critical agency, possibly by mutualisation. We could then transit to a new system of organization that would benefit science as a whole, and not a few selected individual scientists. Too many of us suffer from working in a framework that does not recognize the reality of what we do, and this pushes us towards the bad side of our own personalities. It is saddening to realize the effects this has upon the diversity and richness of the scientific community.

Box 10: Philanthropists who love science: Adopt the post-narcissistic attitude

The support of foundations and philanthropy in general for science is indispensable, but unfortunately money is rarely channelled towards the right people. Hopefully this essay helps to explain why. Philanthropists tend to be fascinated by scientists high in narcissism, who themselves oversell their science and can use tremendous amounts of money for their self-enhancement strategies (their own projects or costly expenditure in order to be appreciated by their peers). For instance, instead of giving money to dedicated ecologists who truly know what nature is, they prefer to support short-term, costly and heavily advertised projects, such as sending a boat led by a charismatic leader over all the world's seas. They find this type of support rewarding and indeed, their names are all over the newspapers and on the boat, but at the end of the journey lies no discovery, just media talk.

Some believe that we need less 'pedestrian' science and instead more of the ambitious grand projects, notwithstanding their feasibility. But this is

wrong – much of science is inspiring and wouldn't require spending large amounts of resource. Another negative consequence of this attitude is that scientists who become members of foundation boards start to be courted by other high N-drive scientists. They are now seen as clever and deep, and this biases the delicate scientific ecosystem by giving more power to few. Philanthropists have to understand that scientists, at least the dedicated ones, are busy with their research and other academic activities, where they should not be distracted by the need for self-marketing and networking. To circumvent this issue, the best way to invest one's money – at least at the moment – would be to invest through the already established channels of funding agencies and accept that there is no direct reward: Spread your money, not your self! This can be done at almost no cost and would avoid many of the negative consequences of overspecialized foundations.

Final remarks

I started this book by describing personality traits often observed in scientists who work in life sciences, and the strategies they use to succeed and attract attention. Egocentrism, elitism, strategic media occupation and self-enhancement strategies are among the first signs that strike a newcomer to the academic world. Scientists are not just focused on their studies! Science, although considered to be one of the most rigorous human enterprises, does not escape taint from human personalities. Hence I suggest that narcissistic traits, as conceptualized by social-personality literature, could be associated with many of these behaviours. An important point to understand, though, is that the observed strategies are not conscious strategies, but rather the consequences of a personality trait. Of course, narcissism in the intellectual world does not look the same as narcissism in the world of celebrities, but it does also seeks to capture the most attention from the community, expects special treatment and places itself on a pedestal. Information from social-personality literature could be easily transposed to the field of science, enriching our analysis, especially when looking at the negative sides of the narcissistic behaviours that are prevalent in life sciences today.

Observing that scientists with a narcissistic character tend to be more successful, we then tried to conceptualize the effect of narcissism in science. I started our analysis using the notion of tacit knowledge, deeply influenced by the work of Polanyi. He highlighted that most scientific activities rely on biological cognitive modules shared with higher animals. As stated by Charles Pierce earlier,

articulate knowledge 'composes only a small part of the mind, the mere blossom of a vast complexus, which we may call the instinctive mind, in which this man will not say that he has faith, because that implies the conceivability of distrust, but upon which he builds as the very fact to which it is the whole logic of his business to be true' (Sanders, 1988, 18). Although accepted by everybody, the consequences of this tacit dimension on the objectivity of science are rarely taken into consideration. Inspired by Polanyi, I proposed that it is impossible to evaluate a scientific statement in a purely objective manner without being influenced by many tacit factors, one of them being the convincing power of the author. Several traits associated with narcissism (self-confidence, charm and an emphasis on style, but also innate traits associated with dominance) contribute to this convincing power. This confers an advantage to scientists high in narcissism. Moreover, scientists high in narcissism will tend to twist their vision of science as a consequence of cognitive bias favouring their own self-enhancement strategy. They would tend to idealize the vision of strategic scientists – either high in narcissism or scientists who provide them with a direct benefit. This also allows us to explain why scientists high in narcissism can recognize each other and establish powerful alliances. The section on evolutionary psychology reveals that the subtle influence of a narcissistic trait in science could be largely derived from an evolutionarily ancient cognitive module involved in social dominance and short-term mating strategies. If narcissism is indeed rooted in our biology and sustained by our so-called cognitive bias, this indicates that the combat against its bad sides will be a difficult one, similar to that undergone by feminists decades ago, but it would be a combat that could also lead to another vision of the world.

Nevertheless, there are serious obstacles that limit our analysis. A first one relates to the complex definition of the narcissistic personality and its diverse ranges of manifestations among different human cultures. Did all the aspects covered in this essay entirely capture

this personality trait? What proportion is related to personality and what proportion to the situation (e.g., situation of power)? Does narcissism fully relate to social dominance? A second problem is that we see others in the light of our own egos. This limits the validity of our observations and possibly makes this text incomprehensible to people very high in narcissism.

Along these lines, we could imagine that two factors influence our judgment. One is the level of basal narcissism in our childhood environment that defined the value of the tacit 'I believe' that we use to evaluate others. The second is our own ego that is influenced by parenting, genetics and other factors (success, present position) that probably place us on an invisible pedestal. Thus, when we evaluate others, we will tend to use the 'I believe' we grew up with as a reference without realizing that now we are in a different position. This explains why we are so good at criticizing others, but not ourselves. A third important difficulty is to see narcissism as a trait for which there is no specific cut-off point. Many of the noxious features we have described are associated with high levels of narcissism ('very big ego') but obviously this trait is continuous and integrates both negative and positive sides. More than that, the negative sides of narcissism can be limited by the upholding of ethical values and a framework of values.

Finally, there is an additional trade-off that should be taken into consideration when evaluating narcissism. As stated earlier, narcissistic scientists succeed better when surrounded by scientists who are low in this trait, such as our meticulous scientist. To fully succeed and capture attention, scientists high in narcissism need a society that works, where communal tasks are carried out. What would happen if all members of society became high in narcissism, seeking undue fame and reward? The whole system would crash. Everybody from train conductors to secretaries to rubbish collectors would require special treatment. Thus, the basal level of narcissism in a society determines the success of individual narcissists. While society

can tolerate a number of stars, a general movement toward higher narcissism could impede overall productivity.

On the rise of narcissism in our society

Using Twenge and Campbell's hypothesis that there has been a rise in narcissism in US society (Twenge and Campbell, 2009), I postulated that many issues in life sciences today (increasing misconduct and the rising influence of networks and communication) could be due to a rise in narcissism that destabilizes many implicit rules within a trusting community. The problem is clear – in a society low in narcissism, narcissistic behaviour brings an advantage to a few individuals, but it becomes a serious threat as more and more individuals become increasingly self-centred. The end result is a costly lack of trust. As discussed above, the remedies are not easy to find because we have to fight against something very appealing. Remember, narcissism is a personality trait and not just a behaviour or a conscious attitude. We cannot take off our personality as we take off a coat. Our personality is part of us – it influences our perception of the world, our own behaviour and human society.

I then discussed a number of proposals, some of which have already been initiated by the scientific community, to counteract some of the negative aspects of this rise in narcissism. There are unfortunately costs associated with certain of these measures and regulations, which are the sad consequence of a decrease in trust. A long-term answer to a rise in narcissism would be to restore community spirit centred on a number of ideals – in this respect similar to the community spirit found in traditional religious communities. This would be the most economical way to proceed because it doesn't require costly control systems. It would also be more acceptable to narcissists themselves, since they tend to disregard rules that they don't consider to apply to them.

Narcissism in science: Is it good or bad?

An important conclusion of this essay is that it is impossible to see narcissism in a dichotomist view as either good or bad. The influence of this personality trait depends on the general framework of our society (our implicit values) and upon the general level of narcissism in our society. Let's try to make an evaluation using parameters based on our present situation in Western countries.

There are three ways to envisage the link between narcissism and success in science. The first is to recognize that this trait correlates with skills that are useful as a scientist. Our essay has mostly underlined the negative aspects of this trait, but narcissism also has its positive sides. Previously we have seen that passion, persuasive power, lack of undue empathy and self-absorption are traits associated with narcissism that are positive for the scientific enterprise. The second is to acknowledge that while a certain dose of narcissism is essential to becoming a scientist, people with an overly strong narcissistic character negatively impede the community, in line with the idea that there is a trade-off. In both cases, the issue is to develop an organizational system that limits the negative sides associated with narcissism. The third possibility is to consider that there is no correlation between narcissistic personality traits and science, but that scientific organizations and social-dominance relationships greatly favour this type of personality.

Thus, a question pertaining to this analysis is the existence of a correlation between narcissistic traits and scientific long-term productivity, with the idea that short-term success does not necessarily mean quality. This is extremely difficult to judge due to the innate aptitude that narcissistic people possess for overselling their science and occupying the centre stage. In fact, a careful study of the history of science tends to underline the complexity of discoveries, the difficulty in attributing credit to one scientist or even in defining what a discovery is. Even if we were to remove the contributions of

many of these great scientists, science would still continue and their discoveries might still exist. The true discoverers are not necessarily the ones who are acknowledged by prizes, because they are often dedicated and meticulous scientists who are not always good self-promoters and storytellers. Taking into consideration the importance of the tacit dimension in science might one day allow us to better acknowledge the diversity of talents required in science and reduce our fascination for the show. Maybe experts on personality, evolutionary psychology and epistemology could team up to better characterize these tacit factors that influence the way we do science today. This self-analysis of the scientific community could give science a more human and modest face.

Michael Polanyi's message on value

> Objectivism has totally falsified our conception of truth, by exalting what we can know and prove, while covering up with ambiguous utterances all that we know and cannot prove, even though the latter knowledge underlies, and must ultimately set its seal to, all that we can prove. In trying to restrict our minds to the few things that are demonstrable, and therefore explicitly dubitable, it has overlooked the a-critical[1] choices which determine the whole being of our minds and has rendered us incapable of acknowledging these vital choices. (Polanyi, 1962, 286)

This essay was written under the influence of a scientist, Michael Polanyi, who left his field of physical chemistry research to move to economics and philosophy. He developed a radically new theory of

1 The term 'a-critical' indicates knowledge that is learnt without exerting any critical spirit. One of the best examples is the language that we learn by impregnation during our childhood. Most scientific knowledge is learnt a-critically – first we become familiar with a research field before applying any critical approach to it.

knowledge that he hoped would provide a truer understanding of the essence of science. In his philosophy there is a constant fight against a vision of science on a pedestal that echoes this essay's combat against the dark sides of narcissism. His message is full of hope, and it is worth closing this essay by considering the underlying values that animate most scientists. The above quotation by Polanyi criticizes what he calls an objectivist vision of science and stresses the importance of recognizing our beliefs even if they cannot be proven. Polanyi was particularly good at showing how certain scientists were able to devaluate other systems of belief using a supposedly objective or neutral point of view. His texts were written at a time when Marxism presented a scientific understanding of history that fascinated intellectuals and scientists, while at the same time devastating large parts of the world. When an objectivist vision of science is adopted, science equals truth and the worst can be expected. This is even worse than fundamentalist religions because men are judged and categorized mechanically in the name of Science, with the help of technology. The objectivist approach that puts science on a pedestal also espouses a cold and detached vision leading to a world of bare facts.

One of Polanyi's first tasks was to debunk the objectivist fallacy. Although no longer truly sustained by scientists themselves, objectivism still exerts a destructive effect on our moral values. Objectivism is the idea that scientists analyse the external world without passion and with a detached perspective. As such, science is supposed to provide a direct view of reality, one that is always right and independent of the knowing subject, an external, almost omniscient view of the world. Polanyi, however, showed that scientific explanations are based on premises that can never be fully explained and that depend on living tradition. These are expressed in a language learnt a-critically during upbringing, that itself conditions our vision of the world. Consistent with the importance of the tacit dimension in humans, our scientific vision depends for better or worse on our sensorial organs and

neuronal circuitry that are themselves the fruit of an evolutionary heritage. Evolutionary psychology stresses the existence of cognitive bias that affects how humans view the world, and this essay is an attempt to show how one human personality trait, narcissism, subtly influences the way we do science, how we evaluate the quality of our colleagues and even how we interpret the world. This impression of objectivity in science is simply due to the fact that we scientists are trained according to the same tradition, belong to the same community and globally share the same personal tacit coefficient. The acceleration of human history is sometimes scary, but it has the value of making us more aware of changes in the implicit conceptual framework that conditions our vision of the world.

For Polanyi, meaning can be restored as soon as we recognize a personal coefficient in the act of knowing. How can we deny that by engaging in their research, scientists give meaning to their own lives? How does human life start? A mother is committed to her baby, chattering to him, playing with him and unconsciously transmitting her values and her language that the baby will later use to decipher the surrounding world as he grows. Life starts with one of the most meaningful acts that make us human. Thus, Polanyi's goal was 'to restore to us once more the power for the deliberate holding of unproven beliefs. We should be able to profess now knowingly and openly those beliefs which could be tacitly taken for granted in the days before modern philosophic criticisms reached its personal incisiveness' (Polanyi, 1962a, 268). When Polanyi was asked about his more fundamental beliefs, he had no hesitation in answering, 'truth, justice and charity'. For him, they were not just mere options in a world made of randomness, but his most vital beliefs. What is truth? It is the idea that there is a reality that can never be completely possessed but that can be touched and shared with our colleagues around the world.

Truth also underlines an idea of consistency between what we say and mean, as opposed to the short-term seduction that characterizes

high narcissism. Truth and justice are qualities that we can find in many people, and, in my life, I have come across these qualities more often in second-tier scientists than in many of the great, but self-centred ones. In this essay, certain behaviours observed in science have been criticized. But how could science exist without the concepts of truth and justice? Our everyday passion in the laboratory, the sense of community that is present at meetings and discussions, and the combat against possible cheaters all require a sense of truth and justice. They are not just options, because they sustain the whole edifice of science and knowledge itself.

One of the main motivations for young adults to enter science is to meet reliable people engaged in these ideals. Charity is another important value. It assigns the same value to every human, poor or rich, and combats our temptation to establish rank. This meets the hope of scientists who believe that the benefits of technology and knowledge should be shared around the world and not just go towards the happy few. Many scientists actually put their careers at risk by analysing questions far removed from popular topics, such as those that affect developing countries. At their own expense they take a stand against funding agencies and politicians obsessed by a short-term view of science's benefits. Most scientists actually embrace Polanyi's values but balk at spelling them out. The day that science moves away from these ideals, it will lose its credibility and attraction and instead be transformed into a mere service for the powerful.

A further interest in upholding our values is that it will be possible to discuss differences among humans without descending into racism and prejudice. Human populations might differ a bit in personality, and this participates in the beauty of the world. As such, one of today's issues is to make this world liveable for everyone, by learning to live together while taking these differences into account. The hope of this essay is not to fight against individuals high in narcissism but against a cold vision of our world that no longer makes sense of it. If scientists high in narcissism step down from their pedestals, constrain

themselves to higher values, and recognize community spirit, they really could be great and even quite fun! My personal conviction is that the practice of science needs high passion, which can be supplemented by a certain dose of narcissism, but this narcissism should be constrained by a solid framework of human values.

A message to young scientists

After reading this essay, a colleague encouraged me to add a more positive note as a conclusion, especially for the benefit of those at the start of their scientific career.

The reader must understand that my criticism of some aspects of scientific practice does not mean dismissing the value of science as a whole. While I do not place scientific research above other human activities, science remains a very attractive path for young inquisitive individuals. Instead of idealising past scientific heroes, I maintain that today's science is in fact much more interesting in terms of accessibility, scope and possibilities.

Some could rightly complain that this essay does not give appropriate acknowledgement to all those meticulous scientists whose example could serve to counterbalance the gallery of narcissistic portraits. There are a number of reasons for this. The most important, developed throughout this essay, is that these meticulous scientists with their low N-drive are not as fascinating; consequently they are not the subject of the biographies and journalistic endeavours, upon which this essay is based. Nevertheless, this might change in the future, as we come to know more about what really hides behind the flashy façades.

Another issue discussed in this essay is the crisis of values that affects biomedical sciences, and the disappointment of many young scientists. Trust and admiration has turned to contempt for greedy bankers, corrupt politicians and doped athletes – will the positive image of scientists be the next to collapse? This is a source of concern

since the scientific community still represents an ideal to many citizens and is even considered to be a reference in this rapidly-evolving world. In such trying times, my recommendation is to remain as faithful as possible to the ideals of science and to try to work with a long-term perspective rather than to follow the hot trends and hype of the moment. It is not too late for science to return to its true values. The current peak of narcissism could just be a transient one or it may prefigure a positive societal change.

Thus, if this essay is marred by a note of bitterness, this is due to the fact that it is a real challenge to combat the features of human nature that constrain us all, and which are often a source of injustice. Nevertheless, the scientific world is actually a great place to observe the subtle and complex influences of difficult personalities, and of social dominance and networks – all in the context of the objective quest for knowledge. This human aspect that colours the scientific adventure is actually one of its most fascinating facets.

References

References for books in the text are indicated as (Name, date, page number).

Agassi, J. (2008). *A Philosopher's Apprentice: In Karl Popper's Workshop*, Krit-Rat.

Alkan, S.S. (2004). Monoclonal Antibodies: The Story of a Discovery that Revolutionized Science and Medicine. *Nature Reviews Immunology 4*, 153–6.

Anderson, C., and Brion, S. (2014). Perspectives on Power in Organization. *Annu Rev Organ Psychol Organ Behav 1*, 67–97.

Anderson, C., and Kilduff, G.J. (2009a). The Pursuit of Status in Social Groups. *Current Directions in Psychological Science 18*, 295–8.

Anderson, C., and Kilduff, G.J. (2009b). Why Do Dominant Personalities Attain Influence in Face-to-face Groups? The Competence-Signaling Effects of Trait Dominance. *Journal of Personality and Social Psychology 96*, 491–503.

Angier, N. (1988). *Natural Obsessions*, Houghton Mifflin.

Argyle, M. (1988). *Bodily Communication*. Methuen & Co. Ltd, (London and New York).

Bachelard, G. (1999). *La formation de l'esprit scientifique*. Librairie philosophique Vrin (Paris)

Beutler, B., and Poltorak, A. (2000). The Search for Lps: 1993–1998. *Journal of Endotoxin Research 6*, 269–93.

Blair, C.A., Hoffman, B.J., and Helland, K.R. (2008). Narcissism in Organizations: A Multisource Appraisal Reflects Different Perspectives. In *Human Performance*, Taylor & Francis, 254–76.

Browne, K.R. (2006). Evolved Sex Differences and Occupational Segregation. *J Organ Behav 27*, 143–62.

Browne, K.R. (2013). Biological Sex Differences in the Workplace: Reports of the 'End of Men' Are Greatly Exaggerated (as Are Claims of Women's Continued Inequality). *Boston U Law Rev 93*, 769–94.

Brummelman, E., Thomaes, S., Nelemans, S.A., De Castro, B.O., Overbeek, G., and Bushman, B.J. (2015). Origins of Narcissism in Children. *Proc Natl Acad Sci USA 112*, 3659–62.

Buffardi, L.E., and Campbell, W.K. (2008). Narcissism and Social Networking Websites. *Pers Soc Psychol B 34*, 1303–14.

Buss, D.M. (2011). Personality and the Adaptative Landscape: The Role of Individual Differences in Creating and Solving Social Adaptative Problems. In *The Evolution of Personality and Individual Differences*. Oxford University Press, 29–60.

Buss, D.M. (2012). *Evolutionary Psychology: The New Science of the Mind*, 4th edn, Pearson Education, Allyn & Bacon.

Buss, D.M., and Chiodo, L.M. (1991). Narcissistic Acts in Everyday Life. *Journal of Personality*, 179–215.

Buss, D.M., and Hawley, P.H. (2011). *The Evolution of Personality and Individual Differences*. Oxford University Press.

Buss, D.M., and Schmitt, D.P. (1993). Sexual Strategies: An Evolutionary Perspective on Human Mating. *Psychol Rev 100*, 204–32.

Campbell, W.K. (1999). Narcissism and Romantic Attraction. In *J Pers Soc Psychol*, 1254–70.

Campbell, W.K., and Foster, J.D. (1997). The Narcissistic Self: Background, An Extended Agency Model, and Ongoing Controversies. In *The Self, Psychology Press* (New York, NY), 115–38.

Campbell, W.K., Hoffman, B.J., Campbell, S.M., and Marchisio, G. (2011). Narcissism in Organizational Contexts. *Human Resource Management Review 21*, 268–84.

Carlson, E.N., Vazire, S., and Oltmanns, T.F. (2011). You Probably Think This Paper's About You: Narcissists' Perceptions of their Personality and Reputation. In *J Pers Soc Psychol 10*, 185–201.

Carver, C.S., and Scheier, M.P. (2012). *Perspectives on Personality*, 7th edition, Pearson.

Casadevall, A., and Fang, F.C. (2013). Is the Nobel Prize Good for Science? *FASEB Journal 27*, 4682–90.

Cheng, J., and Tracy, J.L. (2014). Toward a Unified Science of Hierarchy: Dominance and Prestige are Two Fundamental Pathways to Human Social Rank. In *The Psychology of Social Status*, Springer, 3–27.

Cheng, J., Tracy, J.L., Foulsham, T., Kingstone, A., and Henrich, J. (2013). Two Ways to the Top: Evidence That Dominance and Prestige Are Distinct Yet Viable Avenues to Social Rank and Influence. *Journal of Personality and Social Psychology 104*, 103–25.

Clifton, A. (2011). Narcissism and Social Network. In *The Handbook of Narcissism and Narcissistic Personality Disorder: Theoretical Approaches, Empirical Findings, and Treatments*, W.K. Campbell, and J.D. Miller, eds., 360-70.

Cobb, M. (2015). *Life's Greatest Secret: The Race to Crack the Genetic Code*. Profile Book (London).

Collins, H. Tacit Knowledge, Interactional Expertise and the Imitation Game. Conference at the University of Geneva, March 2014 `mediaserver.unige.ch/play/83622`

Corbyn, Z. (2012). Misconduct is the Main Cause of Life-Sciences Retractions. *Nature 490*, 21.

Cramer, P. (2011). Young Adult Narcissism: A 20-Year Longitudinal Study of the Contribution of Parenting Styles, Preschool Precursors of Narcissism, and Denial. *Journal of Research in Personality 45*, 19–28.

Cummins, D. (2005). Dominance, Status, and Social Hierarchies. In *The Handbook of Evolutionary Psychology*, D.M. Buss, ed., 676–97.

Cuvier, G. (1836). The Victorian Web: Georges Cuvier, 'Elegy of Lamarck'. *Edinburgh New Philosophical Journal Vol. XX (January 1836)*, 1–22. Available on the web.

Damian, R.I. and Brent, R.W. (2015). The Associations of Birth Order with Personality and Intelligence in a Representative Sample of US High School Students. *Journal of Research in Personality 58*, 96–105.

Debray, Q., and Nollet, D. (1997). *Les personnalités pathologiques, approche cognitive et thérapeutique*. Masson (Paris).

Del Guidice, M. (2014). Early Stress and Human Behavioral Development: Emerging Evolutionary Perspectives. *Journal of Developmental Origins of Health and Disease 5(4)*, 270–80.

Eggertson, L. (2013). Stanford Researcher Contends Most Medical Research Results are Exaggerated. *Canadian Medical Association Journal 185*, 868.

Ellis, L. (1995). Dominance and Reproductive Success Among Nonhuman Animals: A Cross-Species Comparison. *Ethol Sociobiol 16*, 257–333.

Emmons, R.A. (1989) Exploring the Relation Between Motives and Traits: The Case of Narcissism. In *Personality Psychology. Recent Trends and Emerging Discussions*, Eds. Buss, D.M. and Cantor, N. Springer Verlag. New York, 32–44.

Fara, P. (2009). *Science: A Four-Thousand Year History*. Oxford University Press.

Feist, G.J. (1998). A Meta-Analysis of Personality in Scientific and Artistic Creativity. *Personality and Social Psychology Review 2*, 290–309.

Feist, G.J. (2006). *The Psychology of Science and the Origins of the Scientific Mind*. Yale University Press.

Feist, G.J. (2006b). The Development of Scientific Talent in Westinghouse Finalists and Members of the National Academy of Sciences. *Journal of Adult Development 13*, 23–35.

Feist, G.J, and Barron, F. (2003). Predicting Creativity from Early to Late Adulthood: Intellect, Potential, and Personality. *Journal of Research in Personality 37,* 62–88.

Foster, J.D., and Brennan, J.C. (2011). Narcissism, the Agency Model, and Approach-Avoidance Motivation. In *The Handbook of Narcissism and Narcissistic Personality Disorder: Theoretical Approaches, Empirical Findings, and Treatments*, W.K. Campbell, and J.D. Miller, eds., 89–100.

Foster, J.D., and Campbell, W.K. (2007). Are There Such Things as 'Narcissists' in Social Psychology? A Taxometric Analysis of the Narcissistic Personality Inventory. *Personality and Individual Differences 43*, 1321–32.

Foster, J.D., Campbell, W.K., and Twenge, J.M. (2003). Individual Differences in Narcissism: Inflated Self-Views Across the Lifespan and Around the World. In *Journal of Research in Personality 37*, 469–86.

Fröhlich, G. (2011). Interview with Prof. Dr. Gerhard Fröhlich on the Schön Scandal: 'Self Control Mechanisms are a Myth in Science to Avoid Any Serious External Control, a.o.t. web, ed.

Garwood, J. (2011). A Conversation with Peter Lawrence: 'The Heart of Research is Sick.' *Labtimes 2* , 24–31.

Gaulin, S.J.C., and McBurney, D.H. (2004). *Evolutionary Psychology*. Pearson Education.

Gautier, M. (2009). Cinquantenaire de la trisomie 21. Retour sur une découverte. *Médecine/Science 25*, 311–6

Gentile, B. (2011). Celebrity and Narcissism. In *The Handbook of Narcissism and Narcissistic Personality Disorder: Theoretical Approaches, Empirical Findings, and Treatments*, K.W. Campbell, and J.D. Miller, eds., 403-9.

Gilbert, P., Price, J., and Allan, S. (1995). Social Comparison, Social Attractiveness and Evolution: How Might They Be Related? In *New Ideas in Psychology*, 149–65.

Godfrey-Smith, P. (2007). Popper's Philosophy of Science: Looking Ahead. In *The Cambridge Companion to Popper*, J. Shearmur, and G. Stokes eds., Cambridge University Press.

Hawley, P.H. (2010). The Role of Competition and Cooperation in Shaping Personality: An Evolutionary Perspective on Social Dominance, Machiavellianism, and Children's Social Development. In *The Evolution of Personality and Individual Differences*, D.M. Buss, and P.H. Hawley, eds. Oxford University Press, 69–72.

Hoffmann, G.W. (2008). *The Immune Network Theory*, available on the internet.

Holmes, F.H. (2004). *Investigative Pathways: Patterns and Stages in the Careers of Experimental Scientists.* Yale University Press.

Holtzman, N.S. (2013). Above and Beyond Short-Term Mating, Long-Term Mating is Uniquely Tied to Human Personality. *Evolutionary Psychology 11*, 1101–29.

Holtzman, N.S., and Donnellan, M.B. (2015). The Roots of Narcissus: Old and New Models of the Evolution of Narcissism. In *Evolutionary Perspectives on Social Psychology,* L.L.M. Welling, T.K. Shackelford, and V. Zeigler-Hill, eds. (pp. 479–89). Springer (New York)

Holtzman, N.S., and Strube, M.J. (2011). The Intertwined Evolution of Narcissism and Short-Term Mating. In *The Handbook of Narcissism and Narcissistic Personality Disorder: Theoretical Approaches, Empirical Findings, and Treatments*, K.W. Campbell, and J.D. Miller, eds., 210-20.

Holtzman, N. S., & Strube, M.J. (2013). People with Dark Personalities Tend to Create a Physically Attractive Veneer. *Social Psychological and Personality Science 4*, 461–7.

Horton, R.S. (2011). Parenting as a Cause of Narcissism: Empirical Support for Psychodynamic and Social Learning Theories. In *The Handbook of Narcissism and Narcissistic Personality Disorder: Theoretical Approaches, Empirical Findings, and Treatments.* K.W. Campbell, and J.D. Miller, eds., 181–90.

Horton, R.S., Bleau, G., and Drwecki, B. (2006). Parenting Narcissus: What are the Links Between Parenting and Narcissism? *Journal of Personality 74*, 345–76.

Horton, R.S., and Tritch, T. (2014). Clarifying the Links Between Grandiose Narcissism and Parenting. *Journal of Psychology 148*, 133–43.

Jacobs, H. (2014). Something Rotten. *EMBO reports 15*, 817.

Jerne, N.K. (1974). Towards a Network Theory of the Immune System. *Annales d'immunologie 125*, 373–89.

Jonason, P.K., Li, N.P., Webster, G.D., and Schmitt, D.P. (2009). The Dark Triad: Facilitating a Short-Term Mating Strategy in Men. In *European Journal of Personality 23*, 5–18.

Jonason, P.K., Valentine, K.A., Li, N.P., and Harbeson, C.L. (2011). Mate-Selection and the Dark Triad: Facilitating a Short-Term Mating Strategy and Creating a Volatile Environment. In *Personality and Individual Differences 51*, 759–63.

Keltner, D., Gruenfeld, D.H., and Anderson, C. (2003). Power, Approach, and Inhibition. *Psychol Rev 110*, 265–84.

Kernberg, O. (1997) *La personalité narcissique*, Dunod.

Kirkpatrick, L.A. (2006). What is the Evolutionary Perspective of Self-Esteem? The Adaptative Functions of Self-Evaluative Psychological Mechanisms. In *Self-Esteem Issues and Answers: A Sourcebook of Current Perspectives*, M.H.

Kernis, ed., Psychology Press, 326–33.
Knight, E.L., and Mehta, P.H. (2014). Hormones and Hierarchies. In *The Psychology of Social Status*. Springer (New York), 269–301.
Lahey, B.B. (2009). Public Health Significance of Neuroticism. *The American Psychologist 64*, 241–56.
Larsen, R.J., and Buss, D.M. (2005). *Personality Psychology: Domains of Knowledge About Human Nature.* McGraw Hill.
Lasch, C. (2006). *The Culture of Narcissism: American Life in an Age of Diminishing Expectations*. FW.W. Norton & Company.
Lawrence, P.A. (2002). Rank Injustice. *Nature 415*, 835–6.
Lawrence, P.A. (2012). Rank, Reinvention and the Nobel Prize. *Current Biology 22*, R214.
Lawton, G., and Webb, R. (2014). Unsung Heroines: Six Women Denied Scientific Glory. *NewScientist*, ed.
Leary, M.R., and Baumeister, R.F. (2000). The Nature and Function of Self-Esteem: Sociometer Theory. *Advances in Experimental Social Psychology 32*, 1–62.
Lelord, F., and André, C. (2000). *Comment gérer les personnalités difficiles*, Odile Jacob.
Levy, K., Ellison, W., and Reynoso, J. (2011). A Historical Review of Narcissism and Narcissistic Personality. In *The Handbook of Narcissism and Narcissistic Personality Disorder: Theoretical Approaches, Empirical Findings, and Treatments*, W.K. Campbell, and J.D. Miller, eds., 3–13.
Lukaszewski, A.W. (2011). The Concept of 'Reactive Heritability': How Heritable Personality Variation May Arise from a Universal Human Nature. *European Journal of Personality 25*, 267-86.
Lukaszewski, A.W., and Roney, J.R. (2015). Reactive Heritability of Extraversion: Where Do We Stand? *Evolution and Human Behavior 36,* 420–2.
Maillard, A. (2007) *Merci Karl ! : 15 ans dans l'ombre de Karl Lagerfeld.* Calman-Levy.
Mazur, A. (2005). *Biosociology of Dominance and Deference*. Ed Rowman & Littlefield.
Mealey, L., Daood, C., and Krage, M. (1996). Enhanced Memory for Faces of Cheaters. *Ethol Sociobiol 17*, 119–28.
Merton, R.K. (1968). The Matthew Effect in Science: The Reward and Communication Systems of Science are Considered. *Science 159*, 56–63.
Miller, J.D., Gentile, B., Wilson, L., and Campbell, W.K. (2013). Grandiose and Vulnerable Narcissism and the DSM–5 Pathological Personality Trait Model. *Journal of Personality Assessment 95*, 284–90.
Mitchell, M.T. (2006). *Michael Polanyi.* Wilmington, Delaware: ISI Books.

Moore, D.W., and Trout, B.T. (1978). Military Advancement: The Visibility Theory of Promotion. In *American Political Science Review*, Cambridge Univ Press, 452–68.

Morange, M. (2003). Les publications de Francois Jacob. *Genesis 20*, 81–90.

Morange, M. (2013). Francois Jacob (1920–2013). *Nature 497*, 440.

Morf, C.C., and Rhodewalt, F. (2001). Unraveling the Paradoxes of Narcissism: A Dynamic Self-Regulatory Processing Model. *Psychological Inquiry 12*, 177–96.

Norenzhan, A. (2013). *Big Gods: How Religion Transformed Cooperation and Conflict*. Princeton University Press.

Pääbo, S. (2014). *Neanderthal Man: In Search of Lost Genomes.* Basic Books.

Paulhus, D.L. (1998). Interpersonal and Intrapsychic Adaptiveness of Trait Self-Enhancement: A Mixed Blessing? *Journal of Personality and Social Psychology 74*, 1197–208.

Pielke, R. (2014). In Retropect: The Social Function of Science. *Nature 507*, 427–8.

Pincus, A.L., and Roche, M.J. (2011). Narcissistic Grandiosity and Narcissistic Vulnerability. In *The Handbook of Narcissism and Narcissistic Personality Disorder: Theoretical Approaches, Empirical Findings, and Treatments*, K.W. Campbell, and J.D. Miller, eds., 31–40.

Polanyi, M. (1962a). *Personal Knowledge: Towards a Post-Critical Philosophy.* The University of Chicago Press.

Polanyi, M. (1962b). The Republic of Science: Its Political and Economic Theory. Minerva *1*, 54–74. Available on web

Polanyi, M. (1964). *Science, Faith and Society.* The University of Chicago Press.

Polanyi, M. (1966). *The Tacit Dimension*, 2009 edn, The University of Chicago Press.

Pollock, M. (1979). An Exciting But Exasperating Personality. In *Origins of Molecular Biology: A Tribute to Jacques Monod*. Academic Press (London). 61–74.

Pringe, P. (2012). *Experiment Eleven: Dark Secrets Behind the Discovery of a Wonder Drug*. Ed. Walter Company, New York.

Raleigh, M.J., and McGuire, M.T. (1994). Serotonin, Aggression, and Violence in Vervet Monkeys. In *The Neurotransmitter Revolution: Serotonin, Social Behavior and the Law*, S.I.U. Press, ed., 146–58.

Raskin, R.N. (1980). Narcissism and Creativity: Are They Related? In *Psychological Reports 46*, 55–60.

Raskin, R.N, and Terry, H. (1988). A Principal-Components Analysis of the Narcissistic Personality Inventory and Further Evidence of its Construct Validity. *J Pers Soc Psychol 54*, 890–902.

Ruetschi, P. (2015). Un fils de Georges Simenon interpelle son père et se livre. *La Tribune de Genève*, 13.10.2015. Available online.

Sandberg, B. (2009). The Lagerfeld Universe: 'An Unbelievable Narcissist'. Spiegel online.

Sanders, A.F. (1988). *Michael Polanyi's Post-Critical Epistemology: A Reconstruction of Some Aspects of Tacit Knowing.* Amsterdam: Rodopi.

Scharlau, W. (2008). Who is Alexander Grotherndieck. AMS available on the web.

Schlomer, G.L., Del Giudice M., and Ellis B.J. (2011). Parent-Offspring Conflict Theory: An Evolutionary Framework for Understanding Conflict Within Human Families. *Psychol Rev 118*, 496–521.

Schmitt, D.P., Alcalay, L., Allik, J., Ault, L., Austers, I., Bennett, K.L., Bianchi, G., Boholst, F., Cunen, M.A.B., Braeckman, J., *et al.* , (2003). Universal Sex Differences in the Desire for Sexual Variety: Tests from 52 Nations, 6 Continents, and 13 Islands. In *J Pers Soc Psychol 85*, 85–104.

Schneider, L. (2105). What if Universities Had to Agree to Refund Grants Whenever There Was a Retraction? In *Retraction Watch*.

SciELO2015 (2015). Reproducibility of Research Results: The Tip of the Iceberg. *SciELO in Perspective* (on the web).

Söderqvist, T. (2002). The Life and Work of Niels Kaj Jerne As a Source of Ethical Reflection. *Scand J Immunol 55*, 539–45.

Söderqvist, T. (2003). *Science as Autobiography – The Troubled Life of Niels Jerne*. Yale University Press.

Stock, J.V. (2012). The Worm Return. *Nature 491*, 183–5.

Sulloway, F.J. (2011). Why Siblings are like Darwin's Finches: Birth Order, Sibling Competition, and Adaptive Divergence within the Family. In *The Evolution of Personality and Individual Differences*, D.M. Buss, and P.H. Hawley, eds. Oxford University Press, 86–120.

Tallis, R.C. (1996). Burying Freud. *Lancet 347*, 669–771.

Touyz, S.W., Polivy, J., and Hay, P. (2008). *Eating Disorders.* Hogrefe & Huber (Cambridge, MA).

Tracy, J.L., Cheng, J., and Robins, R.W. (2011). The Emotional Dynamics of Narcissism: Inflated by Pride, Deflated by Shame. In *The Handbook of Narcissism and Narcissistic Personality Disorder: Theoretical Approaches, Empirical Findings, and Treatments*, W.K. Campbell, and J.D. Miller, eds., 330–43.

Trivers, R. (1972). *Parental Investment and Sexual Selection.* Biological Laboratories, Harvard University.

Trivers, R.L. (1974). Parent-Offspring Conflict. In *American Zoologist* 14, 249–64.

Trivers, R. (2015). Vignettes of Famous Evolutionary Biologists, Large and Small. The Unz Review: An Alternative Media Selection, `www.unz.com/`

article/vignettes-of-famous-evolutionary-biologists-large-and-small/.

Twenge, J.M. (2006). *Generation Me: Why Today's Young Americans Are More Confident, Assertive, Entitled and More Miserable Than Ever Before*. Simon and Schuster.

Twenge, J.M., and Campbell, W.K. (2009). *The Narcissism Epidemic: Living in the Age of Entitlement.* Simon and Schuster.

Ullmann, A., and Lwoff, A. (1979). *Origins of Molecular Biology. A Tribute to Jacques Monod*, Academic Press.

Vernon, P. A., Villani, V. C., Vickers, L. C., and Harris, J. A. (2008). A Behavioral Genetics Investigation of the Dark Triad and the Big 5. *Personality and Individual Differences 44*, 445–52.

Watson, J.D. (1968). *The Double Helix: A Personal Account of the Discovery of the Structure of DNA*. Atheneum.

Wright, N.D., Bahrami, B., Johnson, E., Di Malta, G., Rees, G., Frith, C.D., and Dolan, R.J. (2012). Testosterone Disrupts Human Collaboration by Increasing Egocentric Choices. *Proceedings Biological Sciences 279*, 2275–80.

Yewdell, J.W. (2003). He Put the Id in Idiotype. *EMBO Report 4*, 931.

Yonnet, P. (2006). Sartre-Beauvoir: La nausée. *L'Express*, available online

Zimmer, C. (2013). *I Think I've Just Thought Up Something Important – Francois Jacob (1920-2013)*. Phenomena.

Zwartz, B. (2014). Review: Worth Buying a Boxset of Dislikeable Genius Herbert Von Karajan. The Sydney Morning Herald.

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ISBN 978-2-8399-1841-1

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