Promoting Integrity as an Integral Dimension of Excellence in Research

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Normative analysis of research integrity and misconduct

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Introduction

Discussions of research integrity are often triggered by scandalous cases of misconduct. We are more likely to spot it when things go wrong, and this is why cases of misconduct are likely to precede reflections on what are the positive ideals towards which we want to strive. Furthermore, alarming cases of misconduct call for action, which is why there is an urgent need to define misconduct, so that it could be appropriately measured and sanctioned. In a normative sense, however, it is always some ideal of integrity that must come before misconduct because it is only with respect to a positive ideal that we can categorize something as misconduct in the first place. In order to understand what is wrong with misconduct and why integrity is so important, we must first clarify what are values at stake in the context of research, and what is their normative basis. The aim of the current chapter is precisely to do that.

While both, law and morality, deal with norms and set standard to how we ought to conduct ourselves, the current chapter is focused on moral norms. Moral norms concern what is good and what is bad, and how we ought to live our lives. They differ from legal norms in various respects. First, they have a larger scope. Law just sets minimal standards for conduct and as such it does not cover all conceivable ways how one might go wrong. Ethics has the potential to go beyond that (Shamoo & Resnik 2015, Gert 2007). As such, it is aspirational rather than just compliance-based. Secondly, ethical standards are also more fundamental in the sense that they can be used to critically evaluate and justify legal ones.

In addition to sanctioning illicit behaviour that has already taken place, it is important to cultivate a deeper understanding about the ethical rationale behind various rules and regulations (Vasgird 2007). While one way of making sure that scientists do not misbehave involves adopting a legal-regulatory or control-driven approach, which gets researchers to comply with regulations under the threat of stiff penalties, there are more fundamental reasons besides fear of punishment why researchers should avoid misconduct. By taking a value-based approach, ethics helps to understand that various points listed in codes of conduct and other policy documents are not just about ticking the right box and satisfying a set of merely formal requirements. They run to the core of what it means to be a scientist and a human being. Thus, it provides a good starting point for promoting integrity and preventing misconduct.

The current chapter focuses on illuminating the ethical aspects of research integrity. The first part of the chapter deals with definitions and relationships between key concepts such as integrity, misconduct and trustworthiness. It will be shown how all these concepts, understood in the context of research, involve a reference to the professional values of a scientist. The aim of the second part is to explicate what those values are and where they come from. It will be argued that some of those values derive from features internal to science – its goals and cooperative form, while other can be considered as external values because they are related to science's situatedness in society and depend on general moral norms that pertain to people other than scientists as well. The second part forms the key part of the chapter because it illuminates why

research integrity is important and why certain forms of misconduct are corrosive to science. Third, the normative coherence of various categorizations of misconduct, which can be found from policy documents related to research integrity, will be critically analysed in the light of the normative framework outlined in the second part. The fourth part concerns the differences between principle- and virtue-based approaches to ethics, and the fifth part illuminates how organisations could best make use of those approaches at the level of education, policy, and leadership.

1. The concept of research integrity and its relationship with misconduct and trustworthiness

1.1. Research integrity

In the current chapter, research integrity will be understood as a researcher's commitment to professional values, which reflects in both – attitudes and actions. This conception will be elaborated on in two parts. First deals with to what or whom integrity can be attributed, and clarifies how focusing on the researcher differs from speaking of organisational integrity or the integrity of research findings. Second part categorises research integrity as a form of professional integrity and analyses this specific form of integrity in light of more general philosophical characterizations of integrity.

1.1.1. To what or whom we ascribe integrity?

Throughout various articles and documents, integrity has been regarded as a property of four different things:

1) research findings,
2) individual researchers,
3) research institutions,
4) science as a social system.

First, as a property of **research findings**, integrity refers to correct and reliable research results, which are not corrupted by fabrication, falsification and other similar forms of misconduct (e.g. Anderson et al 2013, Singapore Statement 2010, Hiney 2015: 3). This draws on the meaning of integrity, which refers to the wholeness and intactness of a system or a collection of things, which is not tempered with (Kaiser 2014: 341). This meaning is often used in order to describe inanimate things rather than persons. In a similar way, we might also speak of the integrity of a computerized database or a work of art (ibid, Cox et al 2013).

Perhaps more often, however, integrity is understood as a property of **individuals** (e.g. Steneck 2006, Shamoo & Resnik 2015, Macfarlane 2009). As such, research integrity emphasises the individual researcher's commitment or adherence to a certain set of norms and values, and may in more precise terms also be labelled as "researcher integrity" (see Banks 2015). While according to some conceptions these values may be strictly confined to those that help grant the integrity of the research findings (e.g. honesty and objectivity), they may also be considered to involve other important matters such as social responsibility and a duty of care with regard to research subjects (e.g. Farthing 2014: 423, European Science Foundation & All European Academies 2011: 5). So, the focus need not be only on the end result (reliable research findings), but also on the means by which those results were brought about. It concerns how the researcher conducts himself on the path towards new knowledge.

Third, the term 'research integrity' has also been conceptualised at the level of **institutions**. This refinement comes from the (US) National Academy of Sciences, who differentiates between two types of research integrity – individual and institutional.[1] As a characteristic of institutions research integrity is considered "a matter of creating an environment that promotes responsible conduct" (2002: 34, see also Jordan 2013: 248).[2] It concerns supporting the integrity of individuals – and not just by sanctioning misbehaviour but by helping researchers cultivate professional virtues, and eliminating various pressures and temptations, which might lead them to engage in misconduct.

In addition, it is also possible to speak of research integrity in more over-arching terms, so that it encompasses all the above-mentioned aspects. An interpretation that goes somewhat along these lines can be found from Matthias Kaiser, who attributes integrity to science as "**a social system**, which displays soundness in its functions, and much like an individual is judged in relation to its ethics, i.e. its practitioners behave in accordance with the accepted rules of good conduct within that system" (2014: 341, emphasis added). Insofar as the "soundness of science's functions" can be described in terms of reliable research findings, and organisational structure that is designed to foster rather than inhibit the good conduct of its practitioners, all three above-mentioned interpretations of research integrity could simply be considered as aspects of this more over-arching form of integrity.

Since the current chapter analyses research integrity from an ethical point of view and in ethics 'integrity' is normally considered as a virtuous character trait, **the main emphasis will be on research integrity as a property of an individual researcher**. Ethics is a form of practical philosophy that focuses on the motivations and actions of individual agents. It concerns what kind of people we should strive to be and how to act in particular situations. Focusing on the individual should not be confused with putting all the blame on individuals, and saying that misconduct is only due to individual researchers' moral corruption – their insatiable desire for financial gain, or just ego and vanity, rather than external pressures such as publication pressure, competition, and mentors setting bad examples.[3] The question here is not about the causes of misconduct but about what is right and wrong in the first place. So, speaking of integrity at an individual level is by no means to exclude the possibility that the lack of it may also be conditioned by external pressures. In fact, many ethicists would quite explicitly contend that our very morality and virtue itself is a tender plant that needs a good soil, appropriate amount of light and various other things in order to flourish (see e.g. Nussbaum 2001: 1, 422n3, Athanassoulis 2013: 44ff).

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[1] To be precise, they do not employ the term 'research integrity' but speak of 'integrity in research'. But at least Sara R. Jordan interprets this at the same as 'research integrity' (2013: 248).

[2] The importance of institutions creating environments that foster integrity is also emphasised in various other sources. For example, it stands in the Singapore Statement (2010): "Research institutions should create and sustain environments that encourage integrity through education, clear policies, and reasonable standards for advancement, while fostering work environments that support research integrity." However, in this context, this is not described as *a separate type of integrity* in itself. It is just construed as something necessary in order to promote integrity.

[3] Douglas L. Weed refers to the former (alongside with mental illness) as internal causes of misconduct, and the latter (alongside with the large scale of science, which reduces the opportunities for effective mentoring) as external causes (1998: 126).

Why focus on the individual level? Because when speaking of the integrity of science in the fourth, more overarching, sense, it has a central role to play with respect to the other two more narrow senses of integrity. Let us first focus on its relationship with the integrity of research findings. Since the integrity of research findings ultimately depends on the choices of individual scientists, it would be necessary to speak about the individual level anyway. And the individual level does not just concern the research findings but also the means by which they were arrived at. Even though mistreating research subjects may not affect the validity of research findings, it is nevertheless an important topic that should not be disregarded.[4] A more inclusive conception of research integrity might want to take this into account. Only in this case can we speak of integrity granting trustworthiness in a wider sense of the term. So, while individual integrity covers the issues related to the integrity of research findings, it is also more inclusive.

It is no less important that focusing on researchers rather than inanimate research data adds a more humane dimension to research integrity. It has been argued that speaking of 'integrity' as applied to people rather than a certain system or collection of things reflects the more common meaning of the term (Kaiser 2014: 341). When speaking of integrity, we often speak of "people of integrity" – those who have courageously lived up to their values and not compromised them in face of temptations or hard circumstances. Ethics is especially well suited to capture and specify this interpretation of integrity as an important human virtue.

Secondly, speaking of the individual level is also vital for understanding institutional integrity. The latter deals with creating a good climate where individual integrity could flourish. As such, the individual might be regarded as the main point of reference for analysing organisational integrity (Palazzo 2007: 113). Of course, organisational integrity does not just involve the presence of individuals with good characters, but depends on the design of the context in which those individuals are embedded while making ethical decisions (ibid 113-4). But while individual integrity does not fully cover the topic of institutional integrity, it nevertheless clarifies what it is in the first place that institutions ought to promote and create a supportive environment for.

1.1.2. Research integrity as commitment to professional values

Conceptions of individual integrity can be divided into general and specific forms. More general conceptions focus on an individual's overall integrity and take into account the whole range of one's projects, convictions and actions. Specific types of integrity, on the other hand, only apply to a person in a particular role, e.g. as a member of some profession. (Musschenga 2001: 222, Musschenga 2002: 172f.[5])

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[4] This is, of course, not to say that authors who choose to speak of research integrity in a narrow sense of granting the reliability of research findings would give no weight to issues related to the treatment of research subjects and other associated matters. They would simply not include it under the term 'research integrity'.

[5] To be precise, Musschenga speaks respectively about global and local forms of integrity but since the terms 'global' and 'local' have territorial connotations, for the sake of clarity, we have not introduced these terms in the current chapter.

Research integrity categorises as the latter – it is a form of professional integrity that pertains to one's integrity qua researcher. However, in order to understand this specific form of integrity, it is useful to first look at how **integrity in general** has been conceptualised. These conceptions diverge into two main strands – towards focusing one's personal identity, and bringing morality to the fore. As it will later be shown, the same tendency is also reflected in conceptions of research integrity.

Integrity derives from the Latin word *integritās*, which means wholeness, entireness, completeness. As such, it refers to certain elements forming a coherent whole. In its general form, integrity can be considered to involve at least two types of coherence (adapted from McFall 1987: 7, Fjellström 2005: 234):

1) coherence between one's set of values,
2) coherence between one's values and action.

First, one's values must form a coherent set, i.e. different commitments cannot directly contradict each other. Secondly, these values must also translate into action, i.e. one must live up to one's values.

It might further be emphasised, that the very reason why the term 'value' is used is that it implies more than just conforming to some principle. In her classic analysis of integrity, Lynne McFall emphasises that one must also authentically own one's principles rather than have a merely conventional relationship to them, e.g. following them just because everyone else does so (1987: 6). It might similarly be said, that one must care about the content of the principle, rather than just conform to the principle for the sake of some other end – e.g. in order to avoid punishment or advance one's career. Valuing does not just involve thinking that something is important and should be done, it also involves a vulnerability to a range of emotions (Bell 2013: 120, Scheffler 2010: 22f) – for example, being alarmed if what we value is threatened, or being glad if what we value thrives.

Since integrity might become unattainable if we had to live up to all the things we value, it may be reasonably suggested that those values should be restricted to some more precise set. The main quarrel concerns whether these values should be tied up with one's identity, or morality in general. According to **the identity view**, integrity means being true to one's 'identity-conferring commitments' or 'ground projects', which give meaning to our lives and define who we are (Williams 1973, McFall 1987: 13). A problem with this conception is that it does not rule out commitment to immoral ends and fanaticism[6]. **The moral purpose view** aims to overcome these problems by reducing integrity to the pursuit of a moral life, i.e. to a commitment to do what is best (Halfon 1989: 37)[7]. As such, integrity would still be related to our identity-conferring commitments but only those that count as moral. Sometimes these two views, the identity view and the moral purpose view, are also differentiated as personal and moral integrity (McFall 1987: 114, Musschenga 2001, 2002).

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[6] In case of fanaticism, one need not be committed to immoral ends as such but might simply be willing to pursue one's ends at any cost, which might incline him to choose immoral means to achieve one's ends.
[7] In order to learn more about the identity view and moral purpose view, see also Cox et al 2013.

While **research integrity** is a more specific type of integrity, there is a similar tendency to describe it in terms of identity and moral purpose. On the one hand, it is related to the very identity-conferring commitments that define scientists *qua* scientists[8]. To fail to have integrity, e.g. due to falsifying or fabricating data, is to fail to be a true scientist. As such, research integrity is closely related to intellectual integrity, which concerns the commitment to truth and knowledge (Cox et al 2003: 116, Blustein 1991: 124, Haack 1995). On the other hand, research integrity is often equated with commitment to moral values in general. For example, Sara R. Jordan defines it in terms of "logically coherent positions on ideal moral behavior, backed by actions that demonstrate this position" (Jordan 2013: 252).

Rather than choosing between these two interpretations, it is important to understand how the commitment to truth and to morality intertwine in the professional context of research. According to Damien Cox, Marguerite La Caze, and Michael P. Levine, professional integrity is "a matter of remaining true to the fundamental role and character of one's profession – to its principles, values, ideals, goals and standards" (2003: 104). While some of these values might be definitive of a particular profession and help to differentiate it from others (e.g. justice in case of law, health in case of medicine, knowledge in case of science) and as such can be considered as core values, the relevant values are by no means restricted to the definitive ones. There is a number of values that all professions must respect – for example, respect for other people and their autonomy. So, while it might be argued that a lecturer who has an affair with a student need not lack intellectual integrity (he may indeed be very smart and committed to the pursuit of new knowledge), he would nevertheless lack professional integrity (ibid 115) because he uses his position to take advantage of the people who are entrusted with him.

The more precise relationship between the values related to science as a search for knowledge, and general moral values will be further specified in part 3, that deals with the sources of normativity in science. Before that, however, there are a few remarks in store about the ways in which one may lack integrity, and about how integrity relates to trustworthiness.

1.2. Lack of integrity and misconduct

Integrity has two components – holding a set of coherent values, and living up to those values. Since normally professions are already centred around a more or less coherent set of values (e.g. medicine focuses on healing, science on finding new knowledge)[9], the

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[8] On professional integrity as a localised subclass of the identity view, see also Fjellström 2005: 234.

[9] Of course, there might be problems with coherence at some higher level. In fact, one of the reasons why one might be unable to internalize professional values may well be that they clash with one's personal values. For example, medical practitioners who have strong religious commitments to the sanctity of life, may find it difficult to participate in decisions not to do everything possible to prolong life, even if the patient has a clear advance directive (Beauchamp & Childress 2009: 42). But it may also be the case that one's desire for financial gain and fame is so great that it overshadows the goals of one's profession. These, however, are all questions concerning how professional values will be fitted in one's overall framework of values, and as such are a matter of one's overall integrity rather than research integrity. Matters of the overall integrity will be further elaborated in part 4.2.

problem with specific forms of integrity is not so much about the coherence between professional values than in one's failure to sincerely hold these values. So, in the context of professional integrity, the ways how one may fail to have integrity reduce to:

1) a failure to adopt a particular set of professional values,
2) a failure to conduct oneself according to those values.

While lack of integrity is often discussed in terms of various things that one may *do* (e.g. fabricate, falsify, plagiarize), this is not the only way in which one may lack integrity. In fact, integrity (as understood in the current chapter) and misconduct belong to altogether different categories. While mis*conduct* refers to actions and as such is better contrasted with good conduct or good research practice, integrity is a virtue term that refers to one's character and as such involves a reference to the motivations behind one's actions. This is not to say as if actions and character were not connected. Integrity is a virtue that involves persistency and strength of will to live up to certain values, so misconduct does indeed indicate a lack of integrity, but a lack of misconduct does not necessarily imply that one possesses integrity.

The foundation of living up to professional values in one's actions is constituted by internalizing those values, i.e. adopting a professional identity with the corresponding identity-conferring commitments. One must not just comply with the rules but identify with the ethos of rules. This aspect is also emphasized by the (US) National Academy of Sciences:

> In addition [to behavioral compliance], judgments about an individual's integrity are based on the extent to which intellectual honesty, accuracy, fairness, and collegiality consistently characterize the dispositions and attitudes reflected in a researcher's practice. Judgments about a person's integrity are less about strict adherence to the rules of practice and are more about the disposition to be intellectually honest, accurate, and fair in the practice of science [---]. (2002: 62)

There is a strong focus on understanding the rationale behind the norms and rules, and having the appropriate attitudes and dispositions. One must not just follow the rules but care about the content of those rules, so that one not only does the right thing but also does so for the right reason. For example, obtaining informed consent in order to avoid getting into trouble and ruining one's career is not sufficient. One must also care about the autonomy of the research subject. Regarding a rule or a principle as a tedious formality is a rather inauthentic way to follow it. This is why the "tick-the-right-box" mentality to research ethics can also be considered as a lack of research integrity.

1.3. Integrity and trustworthiness

In The Singapore Statement (2010) and also The Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations. (2013), integrity is defined by reference to "trustworthiness of research" but, at least read on its own, it is not quite clear what this sentence means. Both, integrity and trustworthiness can be considered as **formal or reductive terms**, i.e. they both require a further reference to values that they are founded on (see also Hardin 2001: 1731). Insofar as integrity is defined as

living up to a set of values, it must be further explicated what those values are. And insofar as trustworthiness has been considered as the willingness and ability to live up to one's commitments (Hawley 2012: 113), these commitments too need further specification. There are various things that one may trust another to do or be – to tell the truth, to always be in time, and so on. Both, integrity and trustworthiness, are open-ended concepts, and defining one with another does not seem particularly illuminating.

Furthermore, since both are **structurally very similar**, it may even be questioned whether there is anything informative added by explicating one with reference to the other. Integrity is about living up to one's values and commitments. Trustworthiness, too, is "a matter of fulfilling our commitments" (ibid 7). Furthermore, similarly to integrity, if it is to be understood in a virtue sense, then it cannot be about merely mechanical fulfilment of one's duties but requires proper motivation (Hardin 2001: 1729) – i.e. not fulfilling the commitment only due to external incentives or fear of punishment. So, both, integrity and trustworthiness, involve properly motivated constancy in one's action, i.e. living up to one's commitments. [10]

In more specific formulations, integrity and trustworthiness both also have **a technical and moral aspect**. Research integrity involves a reference to professional values, which include both, epistemic values that aid scientists' quest for knowledge, and also moral values. Trustworthiness is similarly assumed to involve competence and goodwill (Sutrop 2007: 191f, Hawley 2012: 65).

While integrity and trustworthiness are not fully distinct (at least in the context of research), the relationship between the two can be elucidated by saying that trustworthiness is **the external side of integrity**. While from an internal point of view, the importance of integrity lies in the fact that it enables one to live a unified and unalienated life and gives a strong sense of identity and self-respect; looked from the outside it is a basis of trust, which is a further good that one may gain by acting with integrity (Benjamin 1990: 51-52). Of course, in reality, integrity and trust do not always go hand in hand. As pointed out by Margit Sutrop, people may also place blind trust in science when such trust is unwarranted, or be irrationally distrusting (2007: 196). So, integrity is neither necessary nor sufficient to grant trust. But it is nevertheless something that makes people *worthy* of, what Sutrop has labelled as, authentic trust – trust based on critical reflection (ibid).

1.4. Interim summary

Research integrity, as understood in the current chapter, involves internalizing a set of professional values, and living up to them in one's actions. As such, viewed from the outside, integrity also means trustworthiness, because a professional who lives up to

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[10] While in the current chapter we want to highlight the importance of this stronger, virtue interpretation, the structural similarity between integrity and trustworthiness is also evident in case of more narrow definitions. For example, if the focus is only on behaviour, one might speak of "weak trust" (though many philosophers would prefer terms like mere "confidence" (Hardin 2001: 1928) or "reliance" (Baier 1986: 234)). Similarly, integrity in looser sense might be conceived as mere rule-following (Shamoo & Resnik 2015: 15), which only reflects in one's behaviour. So, for every conception of integrity it is possible to construe a corresponding definition of trust, and vice versa.

one's commitments and has an ingrained motivation to do so, is the one we are justified in trusting. Lack of integrity and trustworthiness, however, may first be due to a failure to internalize the relevant values and fulfilling one's commitments out of mere formality. This reduces trust because such person is likely to misbehave when no-one is watching. Secondly, lack of integrity and trustworthiness may be due to misconduct, which constitutes a failure to live up to one's values – either because of lack of motivation, being too weak-willed, or simply due to inability or incompetence. These are the formal characteristics of integrity, trustworthiness and misconduct. The purpose of the next section is to fill these concepts with more specific content and explicate what those professional values involve that scientists must live up to, and where exactly they come from.

2. Normative foundations of research integrity

There are three aspects of science that function as grounds for normative commitments:

1. the goals of science,
2. the cooperative form in which those goals are pursued,
3. science's situatedness within a larger society.

The goals of science illuminate what is distinctive about science compared to other fields of life and help understand why commitment to truth is such an important thing in research. The cooperative form highlights the fact that in order to do science, scientists must work together and get along with each other. Situatedness within a larger society, however, puts restrictions on what scientists can do in order to advance the distinctive ends of their profession, and highlights how ultimately, the goals of science itself, too, are not self-justifying but legitimated only with reference to commonly accepted values.

Next, all these three aspects will be visited in turn, and it will be more specifically outlined how they give ground to various normative commitments that form the foundation of research integrity. By referring to some of the key values and commitments, a more general three-level framework will be provided which helps to understand why research integrity is important and why certain forms of behaviour are categorised as misconduct. This three-level framework will also be followed by a further note on the importance of critical reflection in working to revise, re-evaluate and hold the professional values together as a whole.

2.1. The goals of science

According to an influential line of thought, professional principles and virtues can be derived from the ends of a profession (see Pellegrino 1989: 56). Thus, a good physician is the one who promotes health, and a good judge is the one who promotes justice. Great professionals are dedicated to the ends of their profession and do not compromise their professional values in order to promote their own selfish ends, like financial gain or fame. This reflects a teleological form of reasoning that draws on the works of Aristotle, and was, with its more specific reference to social practices, revived by a contemporary virtue ethicist Alasdair MacIntyre (2007). The key idea is that norms relevant to a particular social practice can be derived from the ends of the practice and are thereby internal to the practice, rather than externally imposed. The idea has been used to ground the internal morality of various fields of life, starting from medicine and ending with the norms of fair play in sport.

How does the idea apply in the context of science? Roughly put, it amounts to saying that since the aim of science is the pursuit of knowledge, a good scientist is the one who possesses the virtues of that promote this pursuit – virtues like honesty, objectivity, critical thinking, and freedom from bias (Pellegrino 1992: 3). Let us visit both, the aims of science, and the relevant virtues, in turn.

It is indeed a traditional and widely shared idea that science is **a search for new knowledge** or, in an idealised sense, a quest for truth.[11] It is about finding things out (Haack 2007: 11). It might also be added that in addition to the search of truth, science also aims at eliminating false beliefs, so that we could overcome ignorance and bias. Together, such goals may be labelled as **epistemic goals** (Resnik 1998: 35).

In addition, science may also have other goals. According to David B. Resnik, epistemic goals are often complemented by **practical goals**, which include solving problems in various areas of applied research (e.g. engineering, medicine, economics, agriculture). Solutions to practical problems promote ends such as human health and happiness, technological power, the control of nature, and so on (ibid). As put by Daniel R. Vasgird: "Science offers humanity its greatest tool for the enhancement of health, well-being, knowledge, and security in a very unpredictable world" (2007: 835). Sometimes the plurality of practical goals, which vary across disciplines and may change over time, makes it seem that there is no goal specific to science as such, but this is an illusion. On a closer view, changes in the practical goals can be understood as expressions of the enduring goal of advancing human knowledge (Kitchner 1993: 160). While practical goals may change, the quest for truth remains the same and forms the backbone of science, which characterises the wide diversity of different research areas. Indeed, it is hard to imagine science being science if the quest for truth were abandoned. Practical goals just give a more specific direction to the search of truth. After all, we do consider some things as more worthy of knowing than others. For example, in medical research, finding an effective treatment to some disease might be far more important than just knowing the average diameter of a male tibia.

Since the quest for knowledge characterises all sciences, the core of the internal morality of science is made up by principles and virtues that are instrumental to achieving the above-mentioned epistemic goals (see also Pellegrino 1992: 3). Those virtues are often respectively labelled as **epistemic virtues** but may also be called intellectual or truth-centred virtues (Martin 2008: 25). One of the most important of such is **truthfulness**. According to Bernard Williams's analysis, truthfulness (just like its German equivalent *Wahrhaftigkeit*) has two aspects: **sincerity** and **accuracy** (Williams 2002: 94, see also Macfarlane 2009: 93). Sincerity (honesty) is a virtue that concerns telling what one believes is true, and finding the right balance in how much of the truth should be told. Accuracy is the virtue that encourages "investigative investment" – putting effort in ascertaining the truth. It concerns questions like "How much trouble is it worth to find out about this?" and "Do I really believe it? Should I?". (Ibid 87.) Shamoo

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[11] "Research activity is a quest for new knowledge" (The Norwegian National Committees for Research Ethics), "'Research' [---] is to be understood as original investigation undertaken in order to gain new knowledge and understanding" (Research Assessment Exercise 2005: 34; UK Research Integrity Office 2009: 19). "Collaborative research should be initiated and conducted for purposes that advance knowledge to the benefit of humankind" (The Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations 2013). "[T]he ultimate aim of science is to establish facts" (The Association of Universities in the Netherlands 2014: 5). "Research, seen as an activity, is the quest for new insights" (DFG German Research Foundation 2013: 92). See also: Weed 1998: 125, Resnik 2014, De Winter 2014: 32, Macfarlane 2009: 91.

and Resnik speak of more or less the same thing in terms of honesty and objectivity, which they describe as the "core principles" of scientific conduct (2009: 32).

Among other related principles and virtues there have also been listed carefulness, diligence, openness and the sharing of information, critical thinking, freedom from bias (ibid 18f, Pellegrino 1992: 3, Haack 2005: 360), love of truth, intellectual courage, intellectual humility, and many others (Martin 2008: 25, Macfarlane 2009: 5). Adherence to these principles and the cultivation of relevant virtues helps to ensure that the quest for truth is not compromised, and that science can function and flourish. It is an integral part of achieving scientific excellence.

Here also lies the reason why certain forms of misconduct, especially falsification and fabrication, are so problematic – they eat at the core of what science is all about, they replace truth with fiction, and thereby also impede the inquiries of other researchers who rely on the relevant work.

While commitment to epistemic values forms an important part of research integrity, it should, however, not be equated with the latter, and is better labelled as intellectual integrity (for accounts of the latter, see: Cox et al 2003: 115ff, Haack 1995, Blustein 1991). The range of values that scientists must respect is not confined with epistemic values. For example, it is also important to take into account considerations of justice and give everyone proper credit. It is only with respect to what is definitive of science and especially unique to it that some of its values can be labelled as "core values" and others as "peripheral", not with respect to the overall ethical gravity of those values. Core values have added weight in the context of research, so that, *ceteris paribus,* a scientist who fabricates is committing a greater wrong than an ordinary person making things up because by taking up the role of a scientist, one also undertakes a special commitment to truth. But this has no implications on whether honesty, even in this emphasized form, is more important than other values, e.g. justice.

The layer of research integrity that is constituted by epistemic values is important because internalizing the epistemic values and cultivating epistemic virtues helps scientists to achieve the goals of science which are largely constituted by a quest for new knowledge. This is both, good for science and good for the scientist as well.

For the scientist, discovering new knowledge constitutes the special good of science that is unlikely to be achieved by other means. Being motivated by this good means that one will be driven by the "intellectual satisfactions of finding new knowledge" (Kassirer 1993: 1634). This gives the scientist a strong sense of identity. Respect for epistemic values is also important for science in general, because it helps to grant the reliability and trustworthiness of research findings, which in turn promotes the overall progress of science because other scientists can rely on those findings. The connection between integrity in the narrow confines of truthfulness and trustworthiness is also emphasised by Bernard Williams. Focusing on truthfulness as consisting in sincerity and accuracy, Williams highlights that "[i]f we are to *rely* on what others tell us they had better be not just sincere but correct" (emphasis added). Furthermore, he goes on to describe truthfulness as "a form of trustworthiness", which is very much in line with the

conception of trustworthiness as the external aspect of integrity that was introduced in 1.3. This also links with Russel Hardin's analysis of trustworthiness as requiring both, competence and proper motivation (2001: 1729). While one might be morally motivated to be honest, honesty alone is not sufficient to grant trustworthiness. It is also important that the scientist be competent.

2.2. Science as a cooperative endeavour

In addition to epistemic values, which form the core of scientific research and highlight its uniqueness in comparison with other fields of life, it is also important to consider the specific form in which scientific inquiry takes place. As put by Susan Haack, "science as we know it is deeply and unavoidably social enterprise" (2007: 12). Even though before the professionalization of science, scientists worked more or less alone, they still had to rely on the work of their predecessors. Nowadays scientists often work in workgroups and due to the complexity of the problems they investigate are even more dependent on both, other members of their workgroup, and researchers at other institutions. In fact, the pursuit of knowledge and science's cooperative form are inextricably connected since the goals of science are best achieved when people join their forces and work together. However, speaking of them in separate, enables us to differentiate between values, norms and virtues that are especially unique to science, and those that are vital for all social practices. While these values can be justified with reference to general moral norms, here they only apply to how one interacts with other members of the research community and as such are instrumental to the functioning of science.

According to Alasdair MacIntyre, there are at least three virtues that are necessary in the context of any social practice, so that the practice could be sustainable and flourish: honesty, justice and courage (2007: 191). While honesty has an important role in all social practices since it enables people to share information about how to best achieve the goals of the practice, its importance is even further highlighted with respect to science as quest for truth (part 2.1). So, here, it will only be added that in addition to being honest about the research findings, it is also important to be truthful in one's daily interactions with colleagues. Next, the main focus will be on justice and courage.

Justice (or **fairness**[12]) requires that we treat others in respect of merit or desert (ibid 192). In science, merit is in great part determined by one's scientific efforts and excellence. Therefore, it is important that everyone received proper credit for their work. This is both, valuable on its own, but also vital to keep people motivated. This is why issues of merit also become especially important when speaking of younger members of the scientific community whose efforts might be exploited by the senior members.

One may err against the demands of justice by giving others less credit than they deserve (often no credit at all) and/or by trying to gain more credit than one deserves oneself. These two aspects complement each other in case of plagiarism, when omitting important contributors as authors, and when coercing others to include one among the authors while one has not contributed to the research. However, the scales are more

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[12] In the current chapter, those terms will be used interchangeably.

tilted towards giving others less credit when discriminating against colleagues on the basis of characteristics irrelevant to scientific excellence. And more on the side of trying to gain extra credit for oneself rather than taking away from others, in case of self-plagiarising and salami publishing.

In addition to being just and honest, it might be explicitly added that one should be generally **respect**ful to colleagues (see also Shamoo & Resnik 2015: 18). This helps to ground good relationships, which help generate a friendly environment where everyone enjoys working in.

The value of **courage**, however, lies in its connection with "**care and concern** for individuals, communities, and causes" (MacIntyre 2007: 192, emphasis added). In fact, 'courage' derives from the Latin root *cor*, which stands for heart. So, being courageous is also about heartfelt commitment to what one values (see also Martin 2003: 4, Macfarlane 2009: 52). In the context of science, this often amounts to caring about the quest for new knowledge – being willing to take up intellectually and emotionally challenging research projects and also being ready to stand up for research integrity if it is being violated (like in case of whistle-blowing). According to Robert Solomon, courage lies at the very core of integrity. He even goes as far as to say that "integrity is essentially moral courage, the will and willingness to do what one knows one ought to", even under tough circumstances (1992: 168, 264).

Honesty, justice, respect and courage are all important because they contribute to the goals of science by promoting trust, which is the glue that "holds together the social fabric of research" (Shamoo & Resnik 2015: 3). Trust is sometimes spoken of as a mere reliance on the research findings of other scientists (see, e.g. National Academy of Sciences 2009: ix, Singapore Statement 2010), but cooperating with other people requires trust in a stronger sense of the term. First, working together also involves honesty about matters other than research findings. Secondly, we trust people not just to be honest but also, among other things, to be just and respectful, and to have the courage to stand up for each other and the common goals. Third, there is also an important difference in what are the reasons behind the trustee's reliability. According to Annette Baier, what differentiates true trust from mere mechanical reliance is that in case of trust we can rely on people's "good will towards one, as distinct from their dependable habits, or only on their dependably exhibited fear, anger, or other motives compatible with ill will towards one, or on motives not directed on one at all" (Baier 1986: 234). What Baier emphasizes here is that a trustworthy person's reasons for action must at least partly derive from her good will towards the trustee rather than only for some external reason like fear of being punished or selfish wish to advance one's career by pleasing other people. Otherwise, the person can at best only be relied upon, just like we may rely on inanimate things like alarm clocks to wake us up, and bridges not to collapse. They perform their function, but trust is not just about robotic performance, it is about actually caring.

By promoting trust, all the above-mentioned virtues, alongside with the respect for science's epistemic aims, are instrumental to the smooth functioning and flourishing of

science, and as such can be considered to form the basis for an internal morality that derives from the very nature of science itself. Viewing research ethics from this angle helps to understand that morality is not just some external thing being imposed on science, but an integral part of science as a cooperative quest for knowledge.

2.3. Science in society

While self-derived ethics has its attractions, it also has its limitations. The main problem emerges when the values dominant in a particular profession come into conflict with other values in society (Goldman 2001: 1384) and may be used to justify violations of everyday morality. In the context of science, this involves the willingness to take unwarranted risks with the interests of humans, other species and the environment (Chadwick 2005: 250) – adopting the mentality that everything is permitted in the name of science. In fact, it has even been argued that the quest for excellence in the performance of a particular role often leads to a certain blindness with regard to other values (Musschenga 2002: 198). As such, science may turn into a rampant form of fanaticism, where the quest for truth eclipses all other values. In addition to posing a threat to other people around them, fanatic pursuit of knowledge may also be harmful for scientists themselves. It may encourage potentially dangerous self-experimentation (Chadwick 2005: 250) and have harmful effects on scientists' moral character (Goldman 2001: 1385) – for example, by making them narrow-minded and reducing their ethical sensitivity.

If the concept of research integrity only encompasses values that promote the quest for knowledge and help scientists to cooperate with each other, there is a danger of downplaying the importance of social responsibility and respect for the autonomy of research subjects, which all derive from general moral norms that pertain to all people. In fact, the very labelling of these norms as "peripheral" (Shamoo & Resnik 2009: 32) or "external" runs the same risk.

Even though speaking of external moral norms helps to highlight the fact that these norms are perhaps not that explicitly grounded in the unique features of science, it is important to note that ultimately the very legitimacy of the goals of science themselves derives from common human values. No practice is self-justifying. A group of assassins could not just appeal to the fact that since assassination is their goal, they are allowed to do it. Similarly, it has been argued that while trust promotes cooperation, its overall value comes down to the nature of the goal for which people are cooperating:

> [I]f cooperation is being developed between two businesses as a way of fleecing their customers, or between a terrorist organisation and a rogue state as a way of furthering their mutual interests in violent ends, then cooperation is something we would want to disrupt, not encourage. (Hawley 2012: 111)

The very reason why science, differently from the above-mentioned practices, has such an important place in society is that scientific knowledge is considered as a valuable human good – both, on its own and in relation to various practical goals. This is also the reason why science can be considered as a profession (Resnik 1998: 32). Even though

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there is no direct client-professional relationship, like there is in medicine or ministry, science too helps society to obtain valuable goals.

In addition to the goals of science (discussed in 2.1) having their ultimate justification in common values, norms that are instrumental to the smooth functioning of the scientific community (discussed in 2.2), too, are further supported by common morality. It could be argued that is not just because it is instrumental to the ends of science that co-workers must be treated with respect, but also because people in general should be treated in a respectful manner.

This is also one of the reasons why many guides to research ethics begin by noting that research is based on the same human values that apply in everyday life (InterAcademy Council 2012: 7, National Academy of Sciences 2009). Overall, the ultimate foundation of science's internal morality lies in the common values, and this is why it does not have the normative force to overstep the demands of common morality. While common values also involve knowledge and beauty, in this section we focus more specifically on moral values. According to Tom L. Beauchamp and James F. Childress, common morality is "a set of moral norms share by all persons committed to morality" (2009: 3). In their influential account of biomedical ethics (1979 and later editions), they outline four principles that reflect the norms of common morality and are especially relevant in the context of biomedical ethics. These principles include (2009: 13):

(1) respect for autonomy (a norm of respecting and supporting autonomous decisions),
(2) non-maleficence (a norm of avoiding the causation of harm),
(3) beneficence (a group of norms pertaining to relieving, lessening, or preventing harm and providing benefits and balancing benefits against risks and costs),
(4) justice (a group of norms for fairly distributing benefits, risks, and costs).

While they focus on medicine and medical research, these principles can illuminate issues related to **ethical treatment of research subjects** in other research areas as well.

In addition to proper treatment of research subjects, it is important to consider **social responsibility** in general as well. Even if there is no direct harm to a particular research subject, there might nevertheless be consequences to the society as a whole. Scientists cannot say 'I just do the science: it is for society to decide what to do with the knowledge' (Chadwick 2005: 251). The principle of social responsibility can be further explicated by referring to the principles of non-maleficence and beneficence: all scientists have ethical obligations to benefit society and avoid causing harm (Shamoo & Resnik 2015: 283). While these are general moral responsibilities that everybody has, these principles have added weight for scientists because they are often funded by public money, or at least have benefitted from public support during their education (ibid 284).

Steadfast adherence to the principles of autonomy, nonmaleficence, beneficence, justice, which promote a morally laudable treatment of research subjects, and social responsibility in general, are important because they help to promote trust between science and society. This involves not just mere reliance on research findings but

confidence in the fact that scientific truth has been obtained by ethical means. Especially in the treatment of human subjects, trust is not just about ticking the right box but is strongly connected to the researcher's virtue (see also Israel 2014: 16). According to Henri Beecher's famous contention: even though informed consent is of utmost importance to protect the subject of clinical research, an even more reliable safeguard is provided by "the presence of an intelligent, informed, conscientious, compassionate, responsible investigator" (1966: 1360). Similarly, Beauchamp and Childress insist that it is only a virtuous person, one who is by character disposed to be "generous, caring, compassionate, sympathetic, fair, and the like", that we can truly trust (Beauchamp & Childress 2001: 29). Rather than appealing to a mere adherence to rules, these statements draws our attention to what kind of person the researcher ought to be.

The importance of trust also highlights the importance of morality in general. By promoting trust, morality promotes human cooperation at the highest level – not just within a group of scientists but between all people in society. Before, it was mentioned that trust within science helps to hold together the social fabric of science. This is the same at the level of society in general. By promoting trust, morality keeps society from falling apart and promotes human flourishing (see also Pojman 2002: 17). It helps to create an environment where everyone can lead a happy life.

2.4. Note on the importance of critical reflection

The last three sections were dedicated to outlining three different sets of important values that are all at stake in doing science. This, however, should not lead to an impression as if integrity was just about commitment to a fixed set of values. As put by Sarah Banks, integrity "entails not just upholding and acting upon all the values of the profession, but also working to revise, re-evaluate and hold them together as a whole" (2015: 5). Next, those aspects will be elaborated on in two parts. First, the focus will be on re-evaluating and revising our values, secondly – on holding them together as a whole. First, it should be noted that the list of values does not pretend to exhaustiveness, and commitment to professional integrity also involves critical reflection over what are the values that should guide scientific practice and the openness to revise those values. A similar idea is emphasised by Alasdair MacIntyre, who argues that traditions are partly constituted by conflicting interpretations of what the tradition is about (1977: 460). Applied in the context of science, this would mean that the science as a social practice is partly constituted by a continuous argument over what it means to be a scientist. Integrity theorists Cox, La Caze and Levine, have called this aspect of integrity as "a kind of continual remaking of the self" (2003: 41). Among other things, in the context of science, this involves a reflection over how science fits into society as a whole – what are its practical goals and responsibilities to humanity.

Secondly, integrity also involves understanding how exactly the professional values of science cling together. It was outlined as a necessary component of integrity that one must hold a coherent set of values (see 1.1.2). However, while in theory there is no necessary contradiction between the professional values outlined in this chapter, in practice these values exist in tension and there may nevertheless come up cases where

we have to balance them against each other. Literature outlines at least two types of conflicts that may take place within the profession of science. On the one hand, there may be conflicts between two or more sets of commitments that are related to one's different roles within the profession, and that will affect one's focus of time, attention and responsibility (Werhane & Doering 1997: 168).[13] A classic example concerns finding time for both, teaching and individual research. On the other hand, there may be conflicts of duties which take place within the same role. For example, a researcher might face a conflict between the duty to share data and to protect confidentiality (Shamoo & Resnik 2015: 198f).[14] Such conflicts become especially pressing if we adopt a pluralist stance and consider science to be guided by different incommensurable values, which – even though they may be considered as objective – can be ranked differently in particular contexts. This calls for a capacity to balance between competing commitments and values, which many integrity theorists hold an important part of integrity (e.g. Coz et al 2003: 41, Banks 2015: 5).

Overall, both – the continual re-evaluation, and balancing of our values – require a capacity for critical reflection. This highlights the processual dimension of integrity – the fact that integrity is also a matter of an ongoing reflection and deliberation on what our values are and what they require. While some theorists go as far as to make this capacity the central feature of integrity (e.g. Edgar & Pattison 2011, Dare 2009, both partly inspired by Calhoun 1995), we suggest that it is only one important component, which has a supportive role with respect to sincere commitment to professional values and upholding them in one's actions. Critical reflection over our professional values helps to ensure an authentic rather than merely conventional relationship with what we value, and the capacity to weigh different values against each other in particular situations is a crucial precondition if we are to translate those values into action.

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[13] In literature, these conflicts are labelled as conflicts of commitments (COC), but since in the current chapter the term 'commitment' is already in use in a wider meaning of the term, the reference is more specifically made to one's roles within a profession.

[14] Literature also differentiates conflicts of interest (COI), which exist between professional interests and personal or financial interests (Werhane & Doering 1997: 168), but those conflicts differ from the two above-mentioned ones in that they refer to scientists' roles outside the profession of science. As such, they impose an external threat to research integrity, but in the current section the focus is only on conflicts that arise between the values and commitments within the profession of science.

3. Normative categories of misconduct

3.1. Broad and narrow senses of misconduct

There are two different senses in which we can speak of misconduct (adopted from Resnik 2003: 132):

1) a particular set of punishable misdemeanours,
2) misconduct as unethical behaviour in general.

Shamoo and Resnik speak of the first interpretation as a legal sense. As such, it involves illegal research behaviour. According to a widely cited US federal definition, misconduct involves fabrication, falsification and plagiarism, which are also known as the so-called FFP (Office of Science and Technology Policy).[15] While in Europe, scientific misconduct is only rarely regulated by legislative instruments (see PRINTEGER deliverable II.4, which focuses on the legal analysis), we may also speak of misconduct in a similar sense when there are non-legislative instruments such as codes of conduct which set special sanctions for certain forms of especially blameworthy behaviours. In any case, when misconduct is spoken of as a set of punishable misdemeanours, it is used as a technical term, which is designed to serve a special purpose, and thus, may differ from how the word is used in ordinary language (Whitbeck 1998: 200). However, in an ethical sense, misconduct can be understood as involving all kinds of unethical and wrongful behaviour, not just the illegal ones (Shamoo & Resnik 2015: 37) or those that are sanctioned by other, non-legislative means. This interpretation takes a more literal reading of the word – misconduct is "bad behaviour, improper conduct" (Oxford English Dictionary).

While the broad, ethical interpretation is useful for promoting responsible research and ethical behaviour, defining misconduct in more narrow terms (as punishable conduct) is useful if the objective is to hold researchers accountable only for certain especially serious wrongdoings (Hiney 2015: 6). Since a broader definition is more inclusive and does not exclude the possibility of making more refined distinctions between different *types* of misconduct, it might be useful to reserve the word 'misconduct' as a general term for unethical behaviour. This approach has also been adopted in the OECD Best Practices for Ensuring Scientific Integrity and Preventing Misconduct (2008), where misconduct is considered to involve not just FFP ("core "research misconduct"") but also various other types of misbehaviours which are organized under the headings of research-practice misconduct, data-related misconduct, publication-related misconduct, personal misconduct, and financial and other misconduct. In the current chapter, however, we will confine the discussion with outlining two normative categories of misconduct. These categories roughly reflect the

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[15] While in Europe, scientific misconduct is only rarely regulated by legislative instruments (see PRINTEGER deliverable II.4, which focuses on the legal analysis), the legal sense can also be widened to include non-legislative instruments such as codes of conduct.

distinction between what have previously been discussed as internal (see part 2.1. and 2.2) and external (see part 2.3) norms of science. First, the focus will be on deceptive and misleading research practices, which constitute breaches of truthfulness (but, as it will be shown, also with justice). This category involves research misconduct in the narrow terms of FFP, and questionable research practices. Secondly, the focus is on breaches of general moral norms (e.g. respect for autonomy).

3.2. Different categories of misconduct

3.2.1. Breaches of truthfulness

Since truthfulness involves both, honesty and accuracy (see Williams's conception that was discussed in 2.1), breaches of truthfulness range from intentional forms of deception (e.g. outright lies, and statements that are present fact selectively and are deliberately designed to mislead) to unintentionally misleading statements that are not fully accurate. While a failure of accuracy may also consist in honest error, the current analysis does not extend to those.

The most serious forms of deception are reflected in **falsification, fabrication and plagiarism**. These offences are sometimes referred to as "research fraud" (Farthing 2014: 425), which further highlights that all involve intentional deception or at least gross negligence.[16] **Questionable research practices** (QRP), however, need not involve intentional deception or an outright falsehood, but may nevertheless result in misleading and not sufficiently accurate presentation of the research findings or authorship. QRPs include misrepresentation, inaccuracy and bias (Steneck 2006: 59ff). These may reflect in behaviours such as enhancing digital images, excluding data from an articles or presentation without a good reason, poor citation practice (Shamoo & Resnik 2015: 39), and so on. QRP is viewed as a kind of grey area that fits on "the continuum between what is truly correct and truly deceptive" (Hiney 2015: 5). While the questionable status allows that sometimes they may be categorised alongside with FFP as misconduct, they are generally considered as less serious (Farthing 2014: 423).[17] Furthermore, since they are by nature questionable as opposed to blatantly improper, they also offer considerable latitude of rationalisation and self-deception (John et al 2012: 524).

Since FFP and QRP involve both, intentional deception and unintentional forms of misleading, they are respectively related to **honesty** and **accuracy**. While both can be considered as values in themselves, their importance can also by justified with reference to further ends. In the context of science there are at least two further ends that are conceptually related to FFP and QRP: 1) the goal of science as quest for knowledge, 2) fairness.

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[16] In this case, the term 'fraud' is used in a broad sense. As a legal concept, it has a more precise meaning and refers to a „knowing misrepresentation of the truth or concealment of a material fact to induce another to act to his or her detriment" (Garner 1999: 292, see also Resnik & Shamoo 2015: 40).

[17] However, while normatively they may be considered as lesser transgressions, since they are more widespread, they may result in greater aggregate harm than FFP (John et al 2012, Martinson et al 2005).

First, if someone is dishonest and inaccurate about the research findings, this makes the **quest for truth** more difficult for other scientists, who rely on his work, as well. Fabrication and falsification are considered as some of the most serious violations because they are antithetical to what science is all about – a search for new knowledge. Of course, insofar as quest for truth is guided by further practical goals, reporting false and misleading results may also result in further harm (e.g. wrong data on the effectiveness of some medical treatment may be harmful for people's health). But whether there is some further harm or not depends on the exact circumstances. Here, the focus will only be on the values that are conceptually and necessarily related to FFP and QRP.

Secondly, they are all related to **justice or fairness**. This connection is especially explicit in case of plagiarism and other issues related to authorship. These forms of misconduct do not result in false research findings (unless, of course, one plagiarises a very poor-quality work). Here, the problem is more explicitly about justice – it is simply unfair to take credit for other researchers' ideas. For this reason it may seem that plagiarism does not neatly fit in one category with falsification and fabrication, but actually they all have connections with justice. Metaphorically, they can be described as a matter of fair play[18]. Fabrication, falsification and plagiarism all involve cheating, taking a shortcut, be it either by making the data up, altering it to fit one's needs, or stealing the ideas of others. The sports analogy has also been employed when talking about QRPs: "QRPs are the steroids of scientific competition, artificially enhancing performance and producing a kind of arms race in which researchers who strictly play by the rules are at a competitive disadvantage" (John et al 2012: 524).

As such, the worry is not unique to science. In sport, for example, it may have an even more constitutive role. Insofar as sport is explicitly about *competition* and *ranking* sportsmen according to their athletic excellence[19], the norms of fair play have an essential role in establishing a correct ranking. But even though science is not *defined* in terms of competition, people compete in various fields of life and much of the current academic life is indeed characterised by competitive performance culture and "results at all costs" mentality (Macfarlane 2009: 139, 146). However, even if research environment was less competitive, it would nevertheless be important to treat other people with justice. In fact, justice can be regarded as part of the internal morality of science, because justice among the members of a social practice is vital for any practice if it is to sustain itself and flourish. Justice supports the pursuit of a common goal by giving everyone proper credit for their contribution. Proper approval of others helps to motivate people to keep up good work, and justified disapproval gives a signal that one ought to change his ways. Knowing that plagiarism will be disapproved also gives an author the confidence that no-one cannot just falsely claim credit for his work.

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[18] In fact, various ethical issues in science have also been discussed under the label of "fair play practices". See, for example Drenth 2002 (but note that he just uses the term passingly and does not explicitly elaborate on its meaning but rather focuses on societal and ethical aspects of science).

[19] Of course, it may also be argued that sport in general is about quest for athletic excellence (see Simon et al 2014), but at least in elite sport, sport normally takes the form of competition.

3.2.2. Breaches of other moral principles

In addition to the categories of FFP and QRP which focus around matters of honesty, accuracy and justice, misconduct may also be considered to involve breaches of other moral principles. This category is well reflected in what the (US) National Academy of Sciences has labelled as "other misconduct" and listed alongside with FFP and QRP. Differently from *research* misconduct (FFP) and questionable *research* practices, other misconduct is not unique to the conduct of science, though it may occur in research environment (National Academies of Sciences 1992: 29). Among other things, those breaches include sexual and other forms of harassment, misuse of funds, vandalism, including tampering with research experiments or instrumentation, and violations of government research regulations, such as those dealing with radioactive materials, and the misuse of human or animal subjects (ibid 6-7). Since the latter may also be considered to involve lack of informed consent, which is indeed somewhat more research-specific than, for example, harassment or stealing a colleague's mobile phone, it might be useful to further differentiate breaches of general moral principles that apply in a particularly research-specific way, and others that apply in a similar way across different contexts. But what unifies both is that they derive from general moral principles (e.g. the requirement for informed consent derives from the principle of respect for autonomy), and as such are distinct from breaches of truthfulness, which directly derive from the goal of advancing new knowledge.

Though this distinction has not been explicitly emphasised in the literature, breaches of general moral norms, too, could be divided into those that are clearly unethical and others that are questionable and may depend on the more specific circumstances, like FFP and QRP in the context of deceptive and misleading research practices. For example, this category might be considered to involve various culturally dependent matters where a universal agreement may be missing.

3.3. What happens if different categories of misconduct are mixed?

The last section (3.2) outlined three main categories of misconduct. Two of them are explicitly research-related: *research* misconduct (FFP), and questionable *research* practices. And the third is related to breaches of other moral norms (the so-called "other misconduct"). This distinction is useful because it highlights the normative grounds on which certain forms of misconduct can be considered as wrong – while FFP and QRP are related to honesty and accuracy concerning the research findings, and fairness with respect to fellow scientists, other misconduct includes breaches of general moral principles. In addition, it has also been suggested that different types of misconduct may require different kinds of institutional responses (National Academy of Sciences 1992: 6). So, there might be further reasons for more meticulous distinctions as well.

In this section, we would like to outline some problems that may arise if types of misconduct are categorised in less neat ways. First, there are a few remarks in reserve for why this may happen. In different countries, integrity and misconduct have been defined in different ways. For example, in the US, integrity tends to be interpreted in more narrow terms – a matter of reliable research findings, and as such it does not, for

example, involve issues related to human research subjects. This is largely a historical coincidence due to the separate development of the US Office of Research Integrity and the Office of Human Research Protection (Anderson et al 2013: 219). But the point is that in this narrow framework, research integrity and research misconduct do in fact form a neat pair, where all clear breaches of research integrity can be considered as research misconduct.

Now, there may also be legitimate reasons for adopting a more inclusive definition of research integrity. Since integrity has become a widespread term, speaking of it in very narrow terms may end up by giving a false impression as if other issues, e.g. those related to the treatment of research subjects were less important than accurate research findings. But, if misconduct is to be considered in opposition[20] with integrity, then, for the sake of consistency, the definition of misconduct should be expanded as well. Or at least, it could be said that in addition to *research* misconduct, there are also other forms of misconduct relevant in the context of research.

Next, we will outline two somewhat incoherent ways of fitting breaches of general moral norms (most notably, perhaps, the duty of care for research subjects and respect for their autonomy) into the categories of research misconduct and questionable research practices.

First of those ways is exemplified by conceptions where other moral transgressions are simply all listed under questionable research practices.[21] This is highly problematic, because QRPs are generally considered as less serious than real research misconduct. If research misconduct is defined solely in terms of FFP, and all general moral issues are listed as QRPs, this gives an impression as if those matters were less important. Furthermore, the label seems to be out of place because it hints as if there were substantial deal of disagreement about the immorality of many those misbehaviours.

Secondly, sometimes breaches of general moral norms are listed alongside with FFP as research misconduct but the general description of research misconduct nevertheless mainly targets the matters related to research findings. This seems to have happened in The European Code of Conduct for Research Integrity (European Science Foundation, & All European Academies 2011: 11), where lack of informed consent and abuse of research subjects is listed as research misconduct but the general description that precedes the list reads as follows:

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[20] Of course, as it was explicated in 1.2 this opposition does not amount to saying that lack of integrity is necessarily sufficient for integrity. If integrity is understood as a virtue term, then integrity requires more than just proper conduct – it also include proper attitudes, dispositions, values, and the like.

[21] While interpretations like that are mentioned in various places, it is somewhat difficult to make out where they originally come from. In The European Code of Conduct for Research Integrity 2011, it is only mentioned without further reference that "in the literature" QRPs have also been considered to involve personal misconduct – intimidation of students, harassment, discrimination, insensitivity to social or cultural norms in doing research, misuse of funds, etc (see page 12). Similarly, Hiney 2015 lists personal misconduct (and many other things) under questionable research practices. In doing so, she refers to the OECD document "Best Practices for Ensuring Scientific Integrity and Preventing Misconduct" (2008), but it should be noted that the OECD document itself does not outline those practices under the name of label of 'questionable research practices'. Instead, there is a table with 6 sections where all various types of misconduct seem to receive an equal place.

> Research *misconduct* is harmful for knowledge. It could mislead other researchers, it may threaten individuals or society – for instance if it becomes the basis for unsafe drugs or unwise legislation – and, by subverting the public's *trust*, it could lead to a disregard for or undesirable restrictions being imposed on research.

In this description it is somewhat unclear whether the damage to individuals and society is explicated as a matter of importance on its own or just as something that subverts public trust and leads to restrictions imposed on research. Since the paragraph starts with maintaining that misconduct is harmful for knowledge, the second sentence can be read as an explication of this idea. As such, it may be considered to imply that the forms of misconduct that threaten individuals but do not directly damage the research record (e.g. lack of informed consent and abuse of research subjects, as we can later learn from the list) are wrong because they may reduce trust in science, and thus call for undesirable restrictions on permissible research. In this case, there would be an indirect damage science's quest for new knowledge. However, it is not just because of damage to science that abuse of research subjects is considered as wrong, but also because it violates general moral norms and constitutes harm to individuals.[22]

All the above-mentioned problems are due to inconsistencies with fitting breaches of general moral norms under the narrow categories that deal with breaches of honesty and accuracy. Differentiating between more precise categories of misconduct and not trying to fit all alongside with FFP and QRP might be a useful way to overcome these problems. It would also help to illuminate more precise normative grounds on which certain forms of misbehaviour can be considered as wrong.

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[22] Of course, the paragraph may be read to highlight only some of the reasons why researchers should abstain from misconduct, but since this is not explicitly emphasised, there is a danger of misinterpretation.

It is also worth noting that the somewhat incomplete justification of why lack of informed consent is wrong might be due to a further unclarity concerning how the lack of informed consent should ultimately be categorised. Namely, different parts of The European Code of Conduct for Research Integrity allow for a different reading. Here, we have relied on the categorisation in part 1. However, in part 2, where research misconduct is explicated in further detail (ibid 11-12), there is no clear mention of lack of informed consent. Furthermore, rejecting personal misconduct (e.g. intimidation of students, harassment) as "not 'scientific misconduct', since it does not affect the integrity of the research record", gives an impression that lack of informed consent should not be included either. After all, there is no direct damage to the research record (like there is in case of "some 'adjustment' of data, cutting a corner, omitting an unwelcome observation…"), This interpretation is further supported by the fact that failure to obtain informed consent is explicitly listed in part 2.2.5 that deals with "many other forms of objectionable practices" that "deserve attention" but are not infringements of "*fundamental* and *universal* norms for responsible conduct in research" (ibid 12). However, many ethicists would argue that lack of informed consent is indeed a breach of a fundamental principle of respect for autonomy (e.g. Beauchamp & Childress 2009). It might simply be suggested that its precise *application* may depend on the culture (see also Pojman & Fieser 2012: 25f). For example, Bruce Macfarlane argues that while respectfulness is important in both, Western and Eastern culture, it may apply somewhat differently in the latter – it amounts to more than just a matter of respecting the needs and interests of the individual but extends to the community (2009: 69). Perhaps a similar view is implicitly assumed in the Code as well, because in yet another section, the Code does indeed emphasise "principles of respect and duty of care" as something that "[r]esearch on human subjects and animals should always rest on" (ibid 11). But all these distinctions would merit from a more meticulous explication.

4. Principle-based versus virtue-based approaches to research ethics

One way to distinguish between different ethical approaches is by whether they focus on moral rules or principles that help us to figure out what the right thing to *do* is, or whether the question concerns what kind of people we should strive to *be* and which character traits to develop. The two approaches are respectively labelled as principle-based, and virtue-based theories. It is important to understand these two theories because they help to highlight different aspects of what it means to have research integrity and to be a good person in a wider sense. As outlined in part 1.1 and 1.2, integrity has two aspects. One concerns principled action, and the other the kind of mind-set behind our actions – our values, attitudes and motivation. While principle-based approaches give guidance on how to act, virtue-based approaches highlight the importance of character and motivation.

In this section, it will be explored in more detail what those approaches exactly involve, what are their strengths and weaknesses.

4.1. Principle-based approaches

4.1.1. Traditional theories and principlism

Principle-based approaches conceive morality as a matter of following certain rules of behaviour. Broadly taken, they diverge into two strands: traditional theory-based approaches, and forms of principlism. Theory-based approaches are monist in that they aim at reducing morality to one overarching principle, a universal formula to guide our behaviour in all conceivable situations. Principlism foregoes such pretensions and settles for a pluralist framework where various more specific moral principles are outlined.

Traditional principle-based approaches involve consequentialist and deontological theories. **Consequentialist** theories evaluate actions based on their consequences. For example, utilitarians advise us to choose the course of action that brings the greatest happiness (and least harm) to the greatest number of people. **Deontological** theories, on the other hand, maintain that some actions are inherently right or wrong, regardless of the consequences. For example, Immanuel Kant would tell us never to use other people as mere means in order to advance our own ends, but always to regard them as ends in themselves, i.e. to respect their autonomy.

Contemporary research ethicists (e.g. Shamoo & Resnik 2009, 2015, following the lead of Beauchamp & Childress 2001; Kitchener 1984, Kitchener & Kitchener 2009, Schrader-Frechette 1994, Macrina 2005, Steneck 2007, Drenth 2010) tend to opt for a more eclectic approach in that they outline a number of more specific and research-adapted principles without having the pretension to unify them under one single theory. This approach is also known as **principlism**. Some of its most well-known proponents

include Tom L. Beauchamp and James F. Childress, who helped put together the Belmont Report (The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research 1979), and soon after published their "Principles of Biomedical Ethics" (1979 and the subsequent editions), where they put forward four key principles for medicine and medical research: respect for autonomy, beneficence, non-malevolence, and justice. With some additions, the same principles have also been adapted to other fields, for example, psychology (Kitchener 1984) and social sciences in general (Kitchener & Kitchener 2009)[23]. It should, however, be noted that since these principles were originally designed to guide ethical behaviour in medicine and medical research, their main focus is on the treatment of human subjects. While this is of utmost importance, issues relevant to research in general also include many other things— among them epistemic matters, which lie that the core of any kind of research insofar as research is conceived as a collective pursuit to advance human knowledge. This is why many authors have come up with slightly different and more broad-based lists. For example, Adil E. Shamoo & David B. Resnik, who explicitly follow Beauchamp and Childress in adopting a principlist account, line up 15 principles of responsible conduct of research: honesty, objectivity, carefulness, credit, openness, confidentiality, respect for colleagues, respect for intellectual property, freedom, protection of animals used in research, protection of human research subjects, stewardship, respect for the law, professional responsibility and social responsibility (2015: 18f). Honesty, objectivity, carefulness and openness (see also Drenth 2010: 419f), which are outlined as some of the first principles in the row, all directly contribute to the achievement of the epistemic ends of science.

Differently from traditional principle-based approaches which seek to reduce morality to some over-arching principle, principlism has been criticised for lacking philosophical unity and coherence. Since it combines elements from conflicting moral theories[24], it may end up with conflicting advice concerning which course of action we should ultimately opt for. At its worst, this may encourage cherry-picking parts of theories that justify decisions (Macfarlane 2009: 154). Many principlists have sought to remedy this problem by complementing their accounts with decision-procedures for resolving conflicts of moral principles (Resnik 2012: 332). While such procedures do not always eliminate all moral disagreements, they can be argued to substantially reduce them (ibid). In fact, due to the complex nature of many ethical problems, it might be unreasonable to expect any ethical theory to come up with quick and easy solution to all cases (Meara et al 1996: 14). This, however, does not mean that principlism could not provide decision-makers with valuable guidance (Resnik 2012: 333). On the other hand, adopting a mixed set of more specific principles also has its advantages. Individual principles have a great intuitive appeal (Shamoo & Resnik 2015: 22), and are often

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[23] In both cases, authors also suggest that we complement the list with fidelity. Focusing on psychology, Meara and colleagues (1996) further insist we that should also include, as a separate principle, veracity.
[24] For example, respect for autonomy is a rather straightforward implication of Kant's formula of never treating people as mere means, whereas beneficence derives from utilitarian duty to promote happiness (Macfarlane 2009: 29).

considered as less controversial than traditional ethical theories that seek to reduce all morality down to one over-arching principle (ibid 22).

Usually, the comparisons between principle- and virtue-based approaches focus on how virtue ethics differs from traditional theories like Kantian duty-based ethics and utilitarianism. However, due to the wide prevalence of principlism in research ethics, the comparison points between principle- and virtue-based theories presented in 4.1.2 and 4.2.2 have been specially tailored to take into account the peculiarities of principlism.

4.1.2. Strengths and weaknesses of principle-based approaches

The analysis begins with an outline of some of the general positive features of principle-based approaches, which are especially highlighted in case of principlism, and then proceeds with the problems and dangers of adopting a principle-based approach.

First, one of the advantages of principle-based approaches over virtue-based ones is considered to lie in their greater **action-guidance**. This is so, because principle-based theories are focused on actions, rather than character. In case of principlism, this feature is considered to take an even more amplified form. Since principlism outlines a set of more specific principles rather than just one over-arching one, as it is the case with traditional deontological and utilitarian theories, principlism is considered to be less abstract and therefore more easily applicable to particular situations. According to Daniel Callahan, traditional principle-based theories turned out to be "too broad and cumbersome" for clinical decision-making and policy formation. Principlism "seemed to have a special appeal to physicians not too interested in ethical theory, but in need of a way of thinking through their ethical dilemmas" (Callahan 2003: 287). The same also applies to researchers working in other fields. This is not to deny that studying traditional principle-based theories would help us gain fuller understanding of individual principles, but rather to highlight that in terms of practicality principlism offers a clearer and simpler solution. It provides a bridge between abstract theory and practice (Meara et al 1996: 11).

Due to the fact that principlist theories are less abstract, they also better help to **understand the rationale behind various rules** that can be found for professional codes and laws. Overall, there are three planes of critical-evaluative moral thinking: at the most abstract level, there is an over-arching theory, secondly come principles, and thirdly rules – all in ascending order of concreteness (see Kitchner & Kitchner 2009: 9.) Judgments about particular cases, however, draw their justificatory force from more general rules, rules from principles, and principles from an over-arching theory. Since rules are grounded in principles, they also help to understand the higher rationale behind them. And since principles are closer to rules than an over-arching theory, principlism also does a better job than traditional principle-based theories. The key problem with principlism, and principle-based approaches in general, is their **neglect of emotional and personal factors** (Campbell 2003: 292). This is a problem that applies to all principle-based accounts, at least insofar as they are indeed purely principle-based. Virtue ethicists, who oppose themselves to such theories, argue that ethics is about more than mere compliance with rules and principles. It is not just about what we

ought to do, but also about the feelings and attitudes that give ground to our actions and accompany them. The lack of attention on our moral character is also one of the reasons why principle-based approaches have been described in terms of moral minimalism, and as such have been regarded as unable to give a full account of moral life (Norton 1988: 180, 183).

There is also another reason why principle-based approaches have been considered as minimalist: namely, they are **often formulated in negative terms** and focus on what we ought not to do (Norton 1988: 180, Pojman & Fieser 2011: 155f). As such, they have been criticised as running the risk of encouraging an overly legalistic viewpoint. They just set some minimal demands for our actions, so that the society could function, but leave little space for aspiration. Virtues, on the other hand, are positive excellences of character – they function as ideals towards which we ought to strive. This criticism is especially relevant in case of duty- and rights-based approaches, but does not necessarily apply to all forms of principle-based ethics. This is so because principles may also have supererogatory content (Beauchamp 1985: 310). For example, beneficence – one of the principles outlined in Beauchamp and Childress's version of principlism – could well be conceived not just as obligatory but also aspirational (Meara et al 1996: 17-18). The aspirational aspect is also emphasised in the code of conduct of American Psychological Association, which begins with general principles that are supposed to "guide and inspire psychologists toward the very highest ethical ideals of the profession", rather than representing strict obligations (2003: 3, see also Meara et al 1996: 6, where those ideals are viewed as conceptually similar to virtues). But even though narrow focus on minimal requirements is not an inherent flaw in principles-based approaches as such, it has nevertheless been a dominant tendency for a long time and should thus be taken into account when formulating or adopting a set of principles.

There is also a second risk, which is perhaps more characteristic of inappropriate ways how principle-based theories can be taught, rather than many principle-based accounts in their original form. This risk concerns **reducing morality to mere mechanical rule-following**. As put by Sarah Banks:

> The real danger of the principle-based approach is if it degenerates into a focus on rules, which are more specific and determined than principles. This then turns research ethics into a matter of learning the rules and how to implement them, rather than a process of critical and responsible reflection. But principles are not the same as rules, and it requires a lot of work to examine what they mean and how and when they apply. It also requires the development of the faculty of good judgement. (2015: 10)

Banks highlights that interpreting and applying the principles is no simple matter but something that requires a great deal of critical reflection. Thus, students should not just be presented with lists of principles (as they should also not be presented with mere lists of virtues! Ibid 7f). While a outline of what this critical reflection involves can be found from the deliberative aspects of Aristotle's conception of practical wisdom (see more under 4.2.2), the emphasis on those deliberative aspects is not conceptually tied to

virtue ethics.[25] Most reasonable principlists give an important role to understanding and applying the principles (e.g. Shamoo & Resnik 2015, Beauchamp & Childress 2009). Also, Michael Davis provides a very detailed account of what it means to really "follow" a rule, rather than just "act according to a rule" (1999: 76, note that what he says about "rules" equally applies to principles). He outlines a number of ways how one might just act according to a rule but not follow it. For example, one might just blindly and unreflectively obey the rule or even maliciously exploit the blind-spots in rules and consciously misread them. True instances of rule-following, however, involve interpreting the rules in light of what is the larger message that the creators of the rules tried to convey, the so-called "spirit of the rule" (ibid 80f). The importance of interpreting and understanding the rules is also emphasised in Resnik 2012: 337. However, both authors only stress the cognitive aspects related to understanding what the rule is about, not the emotional aspects related to caring about the content of the rule or really valuing it (see more on the connection between valuing and emotions in section 1.1.2). For example, Davis compares learning to follow a code of professional ethics with how lawyers learn to interpret the law (1999: 80). This makes it sound like a demanding intellectual exercise, but virtue ethicists would argue that we also need to *live* in the spirit of the rules, and this also involves the adoption of certain attitudes and motivations.

Overall, the main strengths of principle-based approaches involve the fact that they provide more clear guidance of actions, and help to understand the higher rationale behind various rules in codes of conduct. The main problem, however, concerns the neglect of emotions and character, which form an important part of moral life. There are also two dangers, which need not characterise principle-based approaches in their best form, but should nevertheless be watched out for. First concerns the fact that sometimes these approaches tend to focus solely on what we should not do, rather than the setting of aspirational ideals. Secondly, sometimes principle-based approaches tend to be conceived as matters of mere mechanical rule-following but it should be noted that interpreting and applying the principles is no simple matter and requires a great deal of critical reflection.

4.2. Virtue-based theories

4.2.1. Virtue ethics and its applications to research

While discussions of research ethics have been largely dominated by principlism, there has also been a rising concern with virtue ethics. This is related to the general revival of virtue ethics – a classic theory, which has its roots in the teachings of an ancient Greek philosopher Aristotle. While principle-based accounts focus on actions, virtue-based accounts focus on the character of the moral agent. Virtue is a complex character trait

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[25] However, it should be noted that practical wisdom also involves perceptual aspects – seeing the morally salient features of particular situations in the first place, before starting to deliberate on them. This perception may also take place via emotions (Sherman 1999: 40). As such, it might be argued that mere deliberative skills might not be sufficient.

which disposes the person to not only act in a certain morally right way, but also to feel in the right way (Kristjansson 2006: 43). It concerns not just our action but emotions, choices, values, desires, perceptions, attitudes, interests, expectations and sensibilities (Hursthouse 2013). Following the classic Aristotelian analysis, virtues are often viewed as means between two extremes. For example, intellectual humility can be viewed as a mean between the vices of boastfulness and timidity, and reflexivity – a mean between inflexible dogmatism and indecisiveness (Macfarlane 2009: 42). Thus, in great part, being virtuous is a matter of finding the right balance between various extremes.

Sometimes virtues are seen as somewhat redundant in that if we leave aside the extra emphasis on the underlying attitudes, they just copy the corresponding principles. For example, Donald N. Bershoff does not see much difference in speaking about the principle of respect for autonomy and the virtue of respectfulness, or the principle of beneficence and the virtue of benevolence (1996: 87). But this is only natural that there are some important aspects of moral life that both, principle- and virtue-based approaches, have to stress. However, there is much more to virtue ethics than just listings of different virtues. Thus, the focus of the current section will be on the more general framework through which virtue ethics views morality. First, we will go over modern applications of virtue ethics in the context of professions such as science, and see where they derive what it means to be a good scientist. Then, we will move on to explain how those conceptions relate to virtue ethics in its classic and more general form – as concerned with what makes an overall good human being.

One of the most concise applications of virtue theory in the context of research ethics is to be found from Edmund D. Pellegrino's article "Character and the Ethical Conduct of Research" (1992). Pellegrino builds on the work of Alasdair MacIntyre, one of the most influential contemporary virtue ethicists, according to whom virtues can be defined with respect to the aims and goals of certain practices[26]. Applying this idea in the context of science, Pellegrino argues that since the goal of science is to attain new knowledge, virtues of the scientist are those that enable him to do so – the virtues of objectivity, critical thinking, honesty in recording and reporting data, freedom from bias, and sharing knowledge with the scientific community (Pellegrino 1992: 3).

At its core, such reasoning is teleological – virtues are defined by the *telos* or goal that one is supposed to realize. In its traditional, Aristotelian form, virtue ethics applies similar reasoning to human life in general. Considering the goal of life as *eudaimonia* – happiness or well-being that derives from fulfilling ourselves as rational beings and members of society, the central question of virtue ethics is how to live a good life.

Since many virtue ethicists are interested in questions of good life in general, not all of them approach research ethics by just narrowly focusing on the goals of science (like Pellegrino). They also further highlight the role that science and other professions –and henceforth also professional integrity – have in the context of good and flourishing life of both, society in general and also professionals themselves.

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[26] By 'practice' MacIntyre means "any coherent and complex form of socially established cooperative human activity through which goods internal to that form of activity are realized in the course of trying to achieve those standards of excellence which are appropriate to, and partially definitive of, that form of activity [---]". (2007: 187)

First, professions contribute to the flourishing of society. According to Justin Oakley and Dean Cocking, a good profession is such that involves a commitment to a key human good, which plays a crucial role in enabling people to live a flourishing life (2001: 74, see also Oakley 2013: 205, Norton 1988: 187). While medicine promotes health, science promotes knowledge and various practical goals (see 2.1), which both contribute to good life of humankind.[27] This is also one of the central ideas in Mike W. Martin's book "Creativity: Ethics and Excellence in Science" (2008). Martin argues that in great part scientific creativity is also moral creativity because it provides new and *morally* valuable products like "deepened understanding of the world, useful technological goods, and social progress" (2008: 15). He further points out that, for many scientists, engaging in science is an inherently moral undertaking. For example, Gertrude B. Elion's commitment to cancer research was greatly motivated by her grandfather's slow and painful death from stomach cancer (ibid 2). Highlighting science's contribution to society is also an example of how problems with limitations of the "internal morality" of science have been solved within the bounds of virtue ethics. As it was mentioned in 2.3, no practice is self-justifying, so ultimately the goals of any practice must be legitimated by more general human values. According to virtue theory, these general values derive from what enable us to live a good and flourishing life.

Secondly, professions and professional integrity also contribute to the good life of professionals themselves. This takes place in two ways. On one hand, professions enable people to realize their talents and unique potential in certain fields of life. As put by David L. Norton, "if it is the fundamental moral responsibility of every person to discover his or her innate potential worth and progressively actualize it in the world, then vocational choice is clearly one of the important means for such actualization" (1988: 185). The special talents and virtues that science enables to develop are in great part of intellectual kind (see 2.1). On the other hand, as we just saw, the commitment to advance human understanding, and to produce new knowledge which promotes health and other practical goods, can also be conceived as a deeply moral undertaking. According to Martin, this is something that gives a sense of meaning to the work of scientists (2008: 6, remind the example of Elion), and as such contributes to their good life (108). Though Martin does not explicitly focus on integrity, he refers back to the very same identity-conferring commitments which were the basis of Williams's conception of integrity (see 1.1.2) – commitments that define who we are.

The importance of linking one's sense of who one is with being a researcher is also emphasised in Bruce Macfarlane's book "Researching with Integrity" (2009). Macfarlane emphasises the importance of engaging with the researcher as an individual who faces various trials and combats and argues that it is artificial to separate being a researcher from other roles performed by those who conduct research (ibid 3-4). His focus is on integrity "as the integration of a person's true self and linking their values and identity as a person with their practice as a researcher" (ibid 45). As such, he is not strictly speaking of research integrity (one's integrity qua researcher), but focuses on the overall integrity of the researcher qua individual who has different other kinds of roles

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[27] It can be argued that people also value knowledge and more complete understanding for their own sake.

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as well.[28] Some of those other roles involve teaching and management duties (ibid 3-4), but they may also concern one's personal life, friends and family (Macfarlane 2009: 85f, Martin 2008: 106). One's overall integrity is a matter of finding a balance between all those roles and bringing them together for a unified life that one fully identifies with. As such, integrity contributes to the end of the worthy life that is one's own to live (Norton 1988: 186). People of integrity enjoy a strong sense of personal identity, they know what they stand for and experience the satisfaction and self-respect that comes with living in accord with their deepest values (Benjamin 1990: 52).

4.2.2. Strengths and weaknesses of virtue ethics

One of the key strengths of virtue ethics is that it provides a clear link between natural human desires for happiness and self-improvement and moral conduct (Resnik 2012: 33), and as such can be considered as **more personal and inspiring** than principle-based accounts (Pojman & Fieser 2012: 153). Virtues are something that help us realize our potential and live a more fulfilling life. Thus, morality is not just a matter of adhering to rules but a quest for self-development. It is important for scientists not just qua scientists but also as human beings. It facilitates scientists' personal development and helps to integrate professional rules with personal values (Handelsman et al 2009: 105, Macfarlane 2009: 45). Virtue ethics also introduces a more humane dimension to organisational theory because it emphasises not just the efficient achievement of organisational goals, but also the quality of life within the organisation (Hart 2000: 142).

Secondly, by emphasising character, virtue ethics puts a greater emphasis on the **motives** of a moral agent. As it has been emphasised throughout the chapter, a virtuous person does the right thing for the right reason. Often, the proper motivation also involves being sympathetic and caring about other people. As put by Beauchamp and Childress:

> Our feelings and concerns for others lead us to actions that cannot be reduced to instances of rule-following, and most people appreciate that morality would be a cold and uninspiring practice without appropriate sympathy, emotional responsiveness, and heartfelt ideals that reach beyond principles and rules. (2009: 30)

This is also why virtue has strong connections with trustworthiness (see also Israel 2014: 16, Meara et al 1996: 26, Hart 2000: 146). A person we trust has "an ingrained motivation and desire to perform right actions" (Beauchamp & Childress 2009: 33). Due to this stable motivation, a virtuous person is likely to act virtuously even if he knew that his misbehaviour would go undetected or that he could exploit a blind-spot in the rules.

Thirdly, virtue-based accounts highlight the importance of **practical wisdom** (in Aristotelian terms: *phronesis*). Differently from theoretical knowledge which concerns *general* ideas, practical wisdom involves knowing how to exercise virtues in *particular circumstances*. Practical wisdom has perceptual and deliberative aspects (Sherman 1989: 5-6, 1999: 36). The perceptual aspect has also been described in terms of

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[28] Hence also the title of the book – "Researching *with Integrity*" (italics added), rather than "Research Integrity".

discernment and acuity of vision (Punzo 1996: 12, Nussbaum 1992: 37, Hursthouse 2013) – it emphasises seeing the morally salient features of a particular situation and realizing that the situation is of moral relevance in the first place (Sherman 1989: 5, Athanassoulis 2012: 122). The deliberative aspect, on the other hand, concerns a further ability to weigh different kinds of facts and insights against each other in sound and reasonable ways (Loland 2012: 21).

Practical wisdom is of utmost importance in cases where principles conflict, and which thereby proved the most troublesome for defenders of principlism. While some proponents of principle-based approaches have acknowledged the importance of practical wisdom when applying the rules (see Athanassoulis 2012), or otherwise emphasised that one must be able to interpret the principles and know how to apply them (Davis 1999, Resnik 2012: 337), many virtue ethicists would go further than saying that practical wisdom just helps us apply the rules. It is rather the other way around: rules are in service of practical wisdom. They are "rough guides, summaries of past actions" that help us understand a particular case (Sherman 1999: 38). Being responsive to the particulars of a situation also includes sensitivity to the novel features that have been seen before and could not therefore have been housed in any antecedently built system of rules (Nussbaum 1992: 37). This means that people must take much greater personal responsibility for their decisions, rather than just rely on a given set of de-personalized rules (Macfarlane 2009: 34).

It might further be added that attention to the particulars of the situation might also prove especially useful in case of questionable research practices – which might not be wrong in some cases, but may indeed categorise as misconduct proper in other cases. Since QRPs are by definition questionable, it is easy to rationalise them and thus fall into self-deception (John et al 2012: 524). Paying more critical attention to the details of the case – including one's own motivations – is of crucial importance here. The importance of self-awareness and reflectivity is also discussed by many virtue ethicists more explicitly as well (e.g. Macfarlane has a chapter on reflexivity in his 2009). While QRPs are not explicitly prohibited, a virtuous person would nevertheless not engage in them (in cases where they are indeed unjustified).

Overall, virtue ethics takes a **more holistic** approach to what it means to be a virtuous agent – it embraces not just particular actions, but one's character traits, motivations and emotions, and life in general. It also pays special attention to the fine nuances of particular situations.

However, this complexity, even though it can be praised as being true to the moral reality (Hursthouse 2012), also has its cost. Since virtue ethics does not provide a simple formula concerning how we ought to act, it has been criticised as **not sufficiently action-guiding**. Alongside with advising us to cultivate moral judgment and be alert to the situational factors, virtue ethicists also suggest that we follow the lead of moral exemplars and do what an ideally virtuous and morally mature person would do (Hursthouse 2012) but it is not always that clear what exactly this is. Developing virtue and good moral judgment is "a life-long process of moral learning that will only provide clear answers when one reaches moral maturity" (ibid). This is why, even virtue

ethicists themselves have contended that in the early stages of learning virtues, we nevertheless need general rules to guide our way (Sherman 1999: 39).

4.3. On the complementarity of principles and virtues

The sections above have focused on the differences of principle- and virtue-based approaches. Some of those differences have been outlined in the table below.

Principle-based approaches (especially principlism)	Virtue-based approaches
Minimalistic – narrow focus on **actions**, neglect of emotional and personal aspects	More **holistic** – also embraces our **motives**, **emotions and character**
Relatively **clear guidance on actions**, which has a danger of **oversimplifying** moral reality	**Less clear action-guidance**, but takes into account the **complexity** of particular situations
Often there is **no over-arching theory** uniting the principles (or, in case of traditional theory-based approaches, the overarching theory may be too abstract and impersonal)	Since virtues are considered as conductive to **good life** and self-development, virtue ethics is considered as **more personal and inspiring**

It should, however, be noted that while principle-based approaches are more generally focused on actions, and virtue-based ones on character, this is not to say that principle-based theories would be utterly devoid of concern for character, nor that virtue ethicists found rules and principles utterly useless. Rather, the difference lies in emphasis (Norton 1988: 180, Beauchamp 1985: 318). Both highlight important aspects of moral life, and as such may also be considered as **complementary**.[29] In practice, who we are and what we do are inextricably linked (Meara et al 1996: 49). While it is important to live up to principles, this also requires the cultivation of character and proper motivation. While principles serve as good guides to cultivate professional virtues, being virtuous helps to make sure that principles are followed in a reflective and wholehearted manner.

In addition to special emphasis on character, it is also worth paying attention to virtue ethicists' emphasis on practical wisdom – discerning the morally relevant features of particular situations and the capacity to critically weigh different reasons for action. While principlism in its best form also highlights the importance of understanding and applying the rules, virtue ethics provides a great corrective to the danger of reducing morality to mere mechanical rule-following. In addition, while regarding principles as just rough guides, virtue ethics also retains a critical stance of principles and rules themselves. As it was highlighted in 2.4, integrity is not just a matter of upholding and acting upon all values of a profession, but also involves working to revise-, re-evaluate and hold them together as a whole (Banks 2015: 5). As such, practical wisdom is something that forms an important part of what it means to have integrity.

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[29] In fact, many principlists agree to this and have included elements from virtue ethics in their accounts (e.g. Beauchamp & Childress 2001, 2009, Shamoo & Resnik 2015).

5. The relevance of principles and virtues in promoting integrity

While many authors agree that principles and virtues are complementary, there is also some disagreement over how this complementarity manifests itself in practice. For example, Naomi M. Meara and colleagues contend that principles and virtues should in all contexts go hand in hand. While we may separate them in theory, "[a]s a practical matter, however, in ethical decision making, policy development, or the building of professional character, principles and virtues cannot be separated" (1996: 49). This differs from David B. Resnik's suggestion that due to their distinct strengths and weaknesses, principle- and virtue-based approaches should be used in different contexts (2012: 338). More specifically, he suggests that while principle-based approaches should dominate formal education and prove useful in policy development, virtue-based approaches are most relevant in mentoring and leadership, which can be conceived as practices where one demonstrates moral virtues (ibid 339f). The purpose of the current section is to argue against this position and show how principles and virtues are not just to be divided into different domains of promoting research integrity.

The discussion will follow the pillars of promoting research integrity outlined by Resnik. Originally, he outlines four main means by which institutions can promote research integrity among their employees: education, policy development, policy enforcement, and leadership (2012: 338). Since ethics is more focused on prevention, rather than detecting and dealing with already existing misconduct (like policy enforcement), the current section only focuses on education, policy development and leadership. What are the general functions of these three areas? Roughly put, the aim of ethics education is to cultivate people's moral sense, so that misconduct could be prevented, not only dealt with retroactively. Establishing policies helps to support this by making it explicit which standards one is expected to adhere to.[30] Leadership has many important functions, which also include the promoting of ethics education and development of policies, but here the focus will be on how leaders can influence the behaviour of their employees by setting a good example.

Next, it will be shown how both, principle- and virtue-based approaches, can illuminate important dimensions in all of these areas. This should not be conceived as an all-inclusive list of how integrity can be promoted. The main focus is just to underscore the idea that principles and virtues should go hand in hand in all those areas.

5.1. Ethics education

When it comes to promoting integrity, ethics education is of crucial importance. It helps to cultivate people's understanding of research ethics, and as such is also of crucial importance to the people who later become mentors and leaders and influence others with their example.

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[30] This is also very much related to the expressive function of law and its ability to influence behaviour by influencing social norms (see DuBois 2004: 390).

Ethics education includes formal seminars and courses in research ethics, and informal instruction through mentoring (Resnik 2012: 338). Both, principle- and virtue-based systems have an important role in formal education. Principlist accounts are considered as especially suitable for education because they are less abstract than theory-based approaches and are thereby more easily applicable to practice. It is important to note that teaching moral principles involves more than just helping students to internalize a list of rules. Ethics education is not a matter of cultivating blind and mechanical obedience, but should help students to understand what the purpose of the principles is, how different principles relate to each other, and how they ought to be interpreted and applied in specific situations (ibid 337, Davis 1999: 80f). Understanding ethical principles also helps researchers to grasp the larger ethical rationale behind all the numerous rules and regulations, and since it is more inclusive in its scope it can also offer guidance in cases that are not fully covered by the existing written regulations.

Resnik suggests that virtue-based approaches become more important in informal instruction (2012: 339). But the role of virtue ethics in academic curriculum should not be underestimated either. While virtue also requires good role models and lots of practice, and academic courses alone are not sufficient to grant us virtuous researchers, this does not mean that they cannot contribute to the cultivation of character. Virtue ethics can help students to reflect on their values and develop a more personal connection with ethics (Pellegrino 1992: 7, Macfarlane 2009: 34). It can also sensitise them to moral problems so that they begin to recognize the situations that require our moral attention in the first place (Athanassoulis 2013: 121ff). Both, moral sensitivity and reflection on our values (including on how they should be balanced in particular situations) can be cultivated by discussing various real-life dilemmas that researchers' may face in their professional life (for an example of a more specific way how dilemmas could be incorporated into values education, see Sutrop 2015). In addition, while it is important to have real life role models and good mentors, character can also be taught by the study of the lives and intellectual biographies of ethically admirable scientists, whom the students wish to emulate (Pellegrino 1992: 7). For example, reading and discussing about Percy W. Bridgman's internal candour or Niels Bohr's courage to take up difficult problems and advocacy of sharing technical information for peaceful uses (see Holton 2005) may prove more inspiring than just studying the principles. Rich material that engages students' moral imagination can also be found from literary narratives (Athanassoulis 2013: 128, Haack 2005).

But of course, one important way to teach virtue is by a living example set by good role models and critically supervised practice (Macfarlane 2009: 155, Ryle 2010: 325, Pellegrino 1992: 7). So, virtue is indeed important in the context of mentoring. Mentors are going to set an example to their students whether they want it or not, it is from them that students will learn what is accepted and what is not. So, the least that mentors can do is to avoid setting a bad example, but they should also strive for setting a positive example. While virtues may also be taught and learned unknowingly, this should not be left to a matter of chance. Virtue ethics can enhance the mentoring process by providing mentors with an analysis and explication of virtuous character traits that scientists

should model for their students (Resnik 2012: 337). While Resnik tends to see mentoring mainly in terms of role modelling, it is also worth emphasising that informal education should leave room for reflection and more explicit discussion on both, virtues and principles as well. As pointed out by Kristján Kristjánsson, if emulating the role models is not to be reduced into just becoming an unreflective copycat, it is important that students be able to critically evaluate who is worth emulating in the first place and why a particular quality displayed by the role model is to be deemed as morally praiseworthy (2006: 40). So, even for this reason it might be argued that virtue ethics should also be included in formal education. Similarly to the way how knowledge about virtue ethics can help mentors understand which are the character traits they should strive to model for their students, having the proper theoretical background and critical thinking skills can also help students to discriminate which character traits are worth emulating and which not.

5.2. Policy

According to David B. Resnik, policy development can mainly benefit from principle-based accounts (2012: 338). One of the strengths of principle-based systems was that they are considered as more action-guiding – partly because principles are by their very form similar to rules. As such, principle-based approaches help researchers understand the ethical rationale behind various rules that regulate research behaviour. For the same reason, principle-based approaches are also useful in policy development that involves establishing the rules in the first place. While both, official rules and moral principles, are normative, moral principles are more fundamental in a sense that they justify specific regulations. It is not the case that plagiarism is morally wrong because it is prohibited by various regulations, but rather the other way around: it is prohibited because it constitutes a serious breach of moral norms concerning justice and respect for other people's intellectual property. In addition, principle-based approaches can also aid in policy enforcement, which relies on rules related to reporting, investigating, and adjudicating violations of research policies, that can be derived from general ethical principles such as fairness (ibid 338-340).

However, virtues have an important role to play in policy development as well. Naomi M. Meara and colleagues draw attention to the fact that ethics codes reflect more than just rules or principles of a profession. They may also have a preamble that sets forth ideals and aspirations that are not strictly obligatory but towards which the professionals are encouraged to strive (1996: 6, 25).[31] Highlighting these aspirations helps to illuminate what it means to be a good professional, and as such help to put the rules that follow in a wider perspective.

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[31] Sometimes these ideals may be presented as "principles" (e.g. in the American Psychological Association 2010), but as Meara and colleagues point out, conceptually they are nevertheless similar to virtues. In addition, it might be argued that insofar as the Preamble and General Principles paint a picture of what it means to be a good psychologist, they go beyond mere principles and also emphasise the professionals' attitudes as well.

5.3. Leadership

Leaders have a key role in setting the overall climate in their organisations, and this is why they should try "to the best of their ability to foster and cristallize the conception of the ideal in the hearts and minds" of their subordinates (Vasgird 2007: 837). Partly, this will be done by standing for ethics education and policy matters but the importance of the latter has already been highlighted in the previous sections. While all these constitute indirect ways how the leader can reach to its subordinates' hearts and minds (through some intermediary), here, the focus will be more strictly on how leaders themselves, by their own personal example, influence the organisational climate. While ethical leadership has the potential to inspire others to act with integrity, unethical leadership can easily lead to corruption and have a demoralizing effect on the researchers (Resnik 2012: 340). Since leaders have an influence either way, it is crucial that they set out to be good rather than bad role models. By comparing leadership with mentoring, David B. Resnik argues that virtue-based approach provides a better account of the role of scientific leadership in promoting research integrity: "Leadership, like mentoring, can be best understood as a practice in which one demonstrates moral virtues" (ibid). By exemplifying virtuous attitudes and behaviours, leaders can also inspire others to follow their lead.

However, rule-following is relevant to leadership as well – leaders should both, explain the importance of following rules and also set a good example (ibid). The importance of respecting the rules becomes even more clear when we take into account that leaders may be quick to rationalize their misbehaviour and think that since they hold a special position, they are allowed to break the rules – either because they are better than others, or because as leaders they have a right or even responsibility to do whatever necessary in order to advance the goals of the group (Price 2008: 6-7).

Conclusion

The purpose of part 1 was to illuminate the concept of research integrity and specify its relationship with terms like trustworthiness and misconduct. While research integrity may also be ascribed to research findings, organisations, and, in a most over-arching sense, science as a social system, the current chapter focused on interpreting research integrity as a property of an individual researcher. At this level, research integrity involves internalizing a set of professional values, and living up to them in one's actions. As such, viewed from the outside, integrity also means trustworthiness, because a professional who lives up to one's commitments and has an ingrained motivation to do so, is the one we are justified in trusting. Lack of integrity, however, may first be due to a failure to internalize the relevant values and fulfilling one's commitments without really identifying with them, or secondly due to misconduct, which constitutes a failure to live up to one's values.

Part 2 dealt with explicating what exactly those professional values of an integer researcher involve. By doing so, it highlighted the importance of research integrity at three distinct levels, which involved the goals of science, its cooperative form, and situatedness in society. First, while science also has various practical goals, the goal common to the wide diversity of different research areas is constituted by quest for new knowledge. This quest calls for truthfulness, which involves both, honesty and accuracy. Secondly, the cooperative form highlights the fact that in order to do science, scientists must work together and be able to trust each other. Among other things, this end is facilitated by mutual respect and fairness – giving everyone due credit for their contributions. Third, science is no island but part of a larger society. Thus, its quest for new knowledge cannot just irresponsibly override general moral values, and it is also important to pay attention to the treatment of research subjects and social responsibility in general. This promotes trust and cooperation between science and society, which is an important condition for the flourishing of both. In addition to outlining a three-level framework of values at stake in research, it is also emphasised that in practice, research integrity is not just a rigid commitment to a fixed set of values, but also requires critical reflection and the capacity to revise, re-evaluate and hold those values together as a whole. This also includes the ability to balance those values in particular situations.

Part 3 dealt with outlining different normative categories of misconduct that reflect the distinctions made in part 2. One of its main contributions was that it helped to clarify why certain forms of misconduct are wrong. On the one hand, research misconduct concerns breaches of truthfulness that are to do with failures of both, honesty and accuracy. As such, misconduct is defined in terms of falsification, fabrication and plagiarism (FFP), which are all related to deception. Concern for truthfulness is further grounded in at least two distinct concerns. In case of fabrication and falsification, which both result in unreliable research findings, research misconduct obstructs the overall

quest for knowledge. However, all three are forms of cheating. They involve taking a shortcut, by it either by making the data up, altering it to fit one's needs, or stealing the ideas of other, and as such constitute breaches of fairness. In addition, one may also distinguish other misconduct that involves breaches of general moral norms. The chapter also discusses problems related to speaking of these different categories all in one mix, and argues for the need to differentiate between different types of misconduct.

Part 4 disentangles two more specific types of ethical frameworks – principle- and virtue-based approaches. While principle-based approaches are concerned with actions, virtue-based approaches focus on what kind of people we should strive to be and which character traits to develop. Principles are useful in that they give more precise guidance on specific action, and also help us understand the ethical rationale behind various ethical rules. This is so because they are by their very form similar to those rules, and here also lies one of their main weaknesses. Namely, they have been criticised for encouraging an overly legalistic and morally minimalist viewpoint. Virtue ethicists argue that ethics is about more than mere compliance with the rules. It takes a more holistic approach to what it means to be moral by embracing not just particular actions, but one's character traits, motivations and emotions, and life in general. Rather than focusing on rules, it calls us to be sensitive to the morally salient features of particular situations. The cost of painting a more holistic and complex view of morality is that virtue ethics is sometimes considered to lose sight of particular situations. Rather than preferring one theory over the other, we suggest to view the approaches as complementary.

Part 5 further underscores this complementarity by arguing that principles and virtues should not just to be divided into different domains of promoting research integrity, but shows on the example of education, policy development and leadership how virtues and principles can both illuminate important aspects of research ethics in various different contexts. In policy development, principles can aid the formulation of various more specific rules, while virtues can be useful in phrasing the preamble which sets forth ideals and aspirations that help to put the rules in a wider perspective. In leadership, it is of crucial importance to live by the virtues and be a good role model, but leaders should pay critical attention to moral principles as well – even more so that due to their special position they may be especially susceptible to rationalise rule-breaking. Most important of all, however, is proper ethics education because this provides a foundation of understanding of ethical issues for both, students and also future mentors and leaders, who will later influence new practitioners. In education, principle-based approaches can help students understand the rationale behind various rules in codes of conduct, while virtue ethics helps students to reflect on their values and develop a more personal connection with ethics. Both should also be complemented by critical reflection on how to weigh different values, principles and virtues in specific situations.

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