Promoting Integrity as an Integral Dimension of Excellence in Research

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Final Report on the Incidence of Misconduct

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1 Introduction

This deliverable DIII.1.2 is part of work package 3 in which indicators are gathered on the extent of misconduct and how institutions respond to breaches of scientific integrity. As a part of the empirical phase in PRINTEGER it contributes to our analysis of what policies and organizational responses are most likely to engender a culture of integrity in research organisations. The exploration of the incidence of misconduct is combined with the institutional response, since it is partly through this response that misconduct is made explicit or even defined.

This deliverable reflects on one of the key questions in the scientific integrity debate; what is the incidence or extent of misconduct in science? This is one of the questions raised many years ago, but a clear-cut answer is not available and may be even impossible to formulate. What we know about misconduct in science has for the largest part been derived from self-report studies and rough estimations in statistics of universities, control agencies or funding bodies. Therefore, it remains difficult to conclude whether or not these estimations are correct, significant and reliable.

In this deliverable, we report about our attempt to gather empirical data on breaches of integrity that have ended up in *official administrative or institutional* (academic) files e.g. cases which are visible in *administrative procedures of research and research funding institutions* or *bodies for investigating misconduct cases.* With this report, we do not pretend to have found a clear answer to the incidence question. We do however aim to make visible the procedural chain that is followed when a case of misconduct comes to the surface. Besides a 'mapping' exercise, we aim at discussing theoretical and methodological issues when it comes to gathering data relying upon official procedures. Registration practices differ greatly from one research institution to another, from one country to another. This makes comparative research in general (and between the countries involved in this deliverable) very difficult if not impossible.

However, we argue that issues concerning denunciation, discovery and registration practices, whistle blowing, transparency, gaining access, confidentiality, reputational bias etc. are precisely worth a close scrutiny and must be discussed when doing research on the prevalence of misconduct in science in a European context. Indeed, in our view these aspects of the incidence question are not merely technical (or methodological) but they reveal a lot about the nature of scientific misconduct and about how scientific integrity and misconduct are intimately intertwined with daily scientific and academic practices and organization. They are mutually constitutive. Hence, there may be significant differences between disciplinary scientific practices as well as between national science systems (countries). It reveals a lot

about how alleged breaches of integrity and misconduct are experienced, detected, reported, processed, registered and reacted upon.

Starting from a state of the art of what has been measured in previous research, we focused on the biases that have to be taken into account when measuring the extent and incidence of misconduct. Besides a discussion on issues related to the use of official statistics, self-report studies and reputational biases we reflect on the conceptual issues embedded in the process of registration and their consequences for registering practices in administrative procedures. In a next step, we discuss the separate methodologies of the partners involved in this deliverable and the results that were obtained. This report wraps up with a concluding part, reflecting on future directions for research on this topic and the data sources that are useful to measure misconduct in science.

1.1. Background and formation of DIII.1.2

As a preparation for the data gathering, a research protocol was developed, identifying what data partners should collect and how to document sources. This work is the cooperation of the following partners:

The Netherlands	Stichting Katholieke Universiteit Nijmegen & Leiden University
Estonia	University of Tartu
Belgium	Vrije Universiteit Brussel
Norway	Oslo and Akershus University College
Great Britain	University of Bristol
Italy	University of Trento

After the dissemination of the research protocol (a document that identified what data partners should collect and how to document their sources) data gathering plans were drafted by the partners. These plans contained information about the national context, levels at which registration is happening, accessibility of data, and the methodology that the partner had planned to apply. It provided an opportunity to communicate ongoing progress in gathering the data, but also concerns about possible difficulties in getting responses from research institutes and bodies for registering cases of misconduct.

In the following step, key persons in each participating country were contacted for valid information on the bodies of investigating and registering cases of misconduct in research organisations. Subsequently the body (or bodies) for registering cases of misconduct were contacted by each partner and access to data was requested. Such procedures, and accordingly the methodology used by the WP partners differ significantly between the countries involved in this task. In Norway for example, public institutions *must* make available (under the Freedom of Information Act) the necessary information when there has been

a request for it. Yet in other countries, data is publicly available and stored centrally, such as is the case for the Netherlands. In several other contexts, the availability of data depends entirely on the goodwill of the registering 'body' to grant access to the requested information. The specific procedures followed by each partner will be discussed later under the methodological sections.

Next, the participating partners prepared a report on the incidence of misconduct. Some of these reports include actual data on the incidence of misconduct, whilst others are limited to a narrative on administrative procedures as it was not possible to retrieve much information on figures of misconduct due to accessibility and transparency issues. Lastly, this input has been collected and processed into a final report on the prevalence of misconduct in administrative procedures by task leader VUB.

The incidence of intergrity breaches and misconduct can also be related to the retraction of papers and articles submitted for publication to scientific journals. This aspect of the incidence issue will be dealt with in a separate deliverable to be read as complementary to this deliverable (DIII.3.5)

2 Measuring misconduct in science

The reporting of 'known' cases of scientific fraud is sometimes traced back far in history (Ginderich, 1980). This sort of historical perspective suggests that misconduct is of all times. However, the development of institutionalised science in modern times has led to another context in which scientific practices are embedded.

Academic, political or societal attention to the phenomenon of scientific misconduct has recently increased significantly, in parallel with the academic inquiry investigating the incidence of the phenomenon. As criminologists know, increased public scrutiny of a form of deviance often goes hand in hand with the plea for a better (and specific) registration practice, and with a rise in registered deviant behaviour. But, it remains under-researched how the increased preoccupation with scientific misconduct, the development of procedures and registrations practices are functional of the reported increase in incidence of misconduct (The European code of conduct for research integrity, 2011: 11 – see especially footnote 4).

Not only attention for the issue of scientific integrity and misconduct increased, but also the perception of acceptability of certain behaviours in science over time and across scientific fields (Hackett, 1994). These historical changes in mentality have an important impact on what is considered or not as behaviours to be counted for as misconduct. Some behaviour has been placed under increased scrutiny causing the 'rates' of this conduct to inflate (for example recently self-plagiarism). This assumption can easily be

inverted, meaning that certain actions by researchers, previously strongly condemned, are now more widely accepted scientific practices.

These insights lead us to consider the complexity of misconduct in science and the role of social, academic and institutional reactions play in 'shaping' the 'normative transgression', its registration, and thus it's "incidence". Hence, the registration of misconduct cases is never neutral or objective, and always a function of the historical, political and academic context of a moment and a situation. The incidence of scientific misconduct derived from such situated registration practices cannot be taken for granted as representing the "real" incidence.

2.1 The extent of misconduct in science

Estimations about the extent of misconduct in publicly funded research have led both to the assumption that misconduct in science is rare as well as to the belief that the issue is much more common and widespread than we like to acknowledge. The empirical evidence to support either of these two assumptions is scarce and what we know about the extent of misconduct is for the biggest part embedded in empirical research conducted in the United States. We were unable to find relevant figures of misconduct in the European research institutions. Fairly recently, the Science Europe Survey made some attempts to document cases of misconduct, but the retrieved data were not considered substantial enough to draw valid conclusions (ScienceEurope, 2016).

Studies conducted in the USA point out that numbers of officially registered instances of misconduct are low, as compared to the total amount of academics involved in research. In 2000, Steneck stated that 200 cases of misconduct had been confirmed by the federal government over the course of 20 years. When you divide this number by the total amount of researchers (estimated at 2,000,000 at the time), this would result in 1 misconducting researcher in 100,000 per year (Steneck, 2000). In another empirical study, the Office of Research Integrity (ORI) reviewed investigations of scientific misconduct in research funded by the Public Health Service (PHS), and found that 193 cases were reported between 1992 and 2002 (Reynolds, 2004). In a more recent annual report from the ORI (2012) it is stated that there is a 56% increase in handled allegations compared to the allegations handled in 2011 (from 240 cases to 423 in 2012). However, this kind of increases suggests questioning any possible changes in definitions of measured behaviour. The above mentioned numbers support the stance that the widely accepted forms of misconduct such as falsification, fabrication and plagiarism do not occur frequently and are to be considered as "exceptions to typical research behaviour" (Anderson et al., 2013: 229).

Based on the same kind of official data, it has been argued that the cases documented in official numbers are just the tip of the iceberg and that many cases remain hidden. Under such assumption, the 'official' numbers are likely to be an underestimation of the *actual* amount of misconduct. An early warning about the possibility of much larger numbers was alarmingly written down in Broad & Wade's book in 1982: "we would expect that for every case of major fraud that comes to light, a hundred or so go undetected. For each major fraud, perhaps a thousand minor fakeries are perpetrated […]. The roots of fraud lie in the barrel, not in the bad apples that occasionally roll into public view" (Broad and Wade, 1982: 87).

Some studies even came up with hallucinating numbers in order to confirm this assumption, hereby indicating an underestimation of the actual amount of misconduct in cases that are officially reported upon. By conducting a survey at the Third Conference on Research Policy and Quality Assurance, Glick and his colleagues found that 86% of the respondents "had suspicions or even evidence of at least one individual performing questionable studies" (Glick and Shamoo, 1994). It must be pointed out that these estimations and studies use survey and self-report techniques to measure the *idea, experience, perception or even feeling* academics have about the existence of misconduct, which is not the same as the counting of reported (alleged) transgressions.

Based on this kind of research, the problem seems to be more widespread; the more so when a broader stance is taken by including other deviating practices that are not as such included under the (Fabrication, Falsification and Plagiarism (FFP) umbrella. To get a grasp of the misconduct that is situated under the surface (i.e. the cases reported in official numbers), numerous self-report studies have been conducted (for example; Gardner et al., 2005; Bebeau and Davis, 1996; Swazey et al., 1993; Kalichman and Friedman, 1992; John et al., 2012; Henry et al., 2005; Geggie, 2001). Most of these studies have been focusing exclusively on ethical issues in medicine and health disciplines. There have been a few exceptions: for example List and his colleagues (2001) have measured the degree to which academic economists have engaged in scientific misconduct and John et al. (2012) measured the prevalence of Questionable Research Practices (QRP's) in the psychological sciences (John et al., 2012; List et al., 2001).

The methods used in these studies relate closely to studies on forms of deviance or crime, well known in the field of criminology, where certain populations (for example youngsters in youth justice studies) are asked to report on their own behaviours. This method has been introduced in many studies on scientific misconduct and is seen as partially corrective of the limitations in official statistics. Besides a survey on participants' own behaviour, these studies might ask respondents to report on their perceptions on ethical behaviour in science and observed misconduct in their research environment.

Titus et al. (2008) surveyed 2,212 researchers, asking them how many times they had observed suspected misconduct in their own department in the past three years. The study found that the participants observed three incidents per 100 researchers (201 'likely' incidences of misconduct). These findings do not match the results in ORI's annual report (see above) and suggest that many cases go unreported (Titus et al., 2008; Wells, 2008).

In an influential self-report study conducted by Martinson et al. (2005), early and mid-career scientists (funded by the National Institutes of Health - NIH) were asked to report on their own behaviours. Under 2% of the participants admitted being personally engaged in the most serious forms of misconduct (within the previous 3 years), including FFP. These numbers are more or less in line with the statistics obtained through 'confirmed misconduct' cases in publicly funded research in the US (see previous discussion). The most fascinating finding however, is the striking quantity of ORP reported upon by the respondents. An impressive 33% "of the respondents said they had engaged in at least one of the top ten1 of listed behaviours during the past three years" (Martinson et al., 2005: 738). In another famous study, Fanelli (2009) conducted a meta-analysis of self-report studies and came to the conclusion that an average of 1,97´% of scientists had admitted to be involved in fabrication, falsification or modification of the results, while up to 33,7% admitted to 'other questionable research practices'2.

Both above-mentioned studies point to the likelihood of an underestimation of the official numbers, as the authors believe that researchers involved in deviant scientific behaviour will either refuse to participate or formulate answers in a way that is social desirable. The authors concluded that the 'regular' behaviours (those who occur on a daily basis but fall outside the strict definitions) are presenting great threats to the scientific enterprise as they seem to be much more common and widespread than those cases listed under the narrow interpretation of the concept misconduct (Fanelli, 2009; Martinson et al., 2005).

1 (1) falsifying or ‚cooking' research data, (2) ignoring major aspects of human-subject requirements, (3) not properly disclosing involvement in firms whose products are based on one's own research, (4) relationships with students, research subjects or clients that may be interpreted as questionable, (5) using another's ideas without obtaining permission or giving due credit, (6) unauthorized use of confidential information in connection with one's own research, (7) failing to present data that contradict one's own previous research, (8) circumventing certain minor aspects of human-subject requirements, (9) overlooking other's use of flawed data or questionable interpretation of data, (10) Changing the design, methodology or results of a study in response to pressure from a funding source (Martinson et al., 2005).

2 In this particular study, the following behaviours are examples of questionable practices in research: cooked or minced data in order to portray statistically relevant relationships, selective publishing of positive results (only when the results confirm the hypothesis), conflicts of interests, etc. (Fanelli, 2009).

2.2 Current issues complicating the measurement of misconduct in science

It has become clear that, depending on the source of the data, methodology, and definitions used, figures vary significantly in studies on the extent of misconduct, leaving most of the previously asked questions unanswered. Therefore, we need to reflect on several issues complicating the measurement (and registration) of misconduct in science. Such problems occur at distinct levels and the issues that we need to reflect and discuss are: (1) the process of detection (official registration, cf. crime statistics), (2) issues related to the assessing of the actual occurrence of misconduct and misbehaviour in science (self-report), (3) conceptual challenges, (4) the registration and recording of misconduct, and (5) punishment of misconduct. These issues will inevitably have an influence on 'what we know about the prevalence of misconduct'. We will reflect on each issue separately in this section:

2.2.1 The prevalence of misconduct in official registration

Government statistics lead to lower estimates of misconduct compared to the numbers derived from self-report studies. This difference needs to be understood. Self-report studies and official statistics or registration do not measure or register the same thing. On the one hand this difference points at the large dark number, but on the other hand it gives arguments to support the 'bad apple' approach, indicating that fraud in science is not so common. It seems important in this exploration of the incidence of misconduct that we keep this ambiguous reading of available but different data (sources) in mind. Hence, it is certainly pertinent to consider how cases are (or not) reported to the different authorities involved in the administrative procedures of dealing with misconduct; what is the nature of these reported alleged breaches of integrity or misconduct; *how* they are qualified, investigated or prosecuted; and last but not least if they are considered proven and sanctioned.

When reflecting on this, one can find interesting and inspiring discussions in criminological literature on crime statistics (see for example; Biderman and Reiss, 1967; Coleman and Mouynihan, 2009; Black, 1970; Kitsuse and Cicourel, 1963). The detection, registration and ultimately qualification of (scientific) misconduct are part of steps in a process of the establishment of a definition and the 'prosecution' of scientific misconduct. Distortion or selection can occur at each of these subsequent steps.

First, misconduct in science needs to be detected, 'discovered' or even more simply put: needs to be seen as such by colleagues and peers. However, there is no official 'detecting unit' in academic institutions, and there are not necessarily identifiable 'victims' who could report an incident to the attention of an official agency.

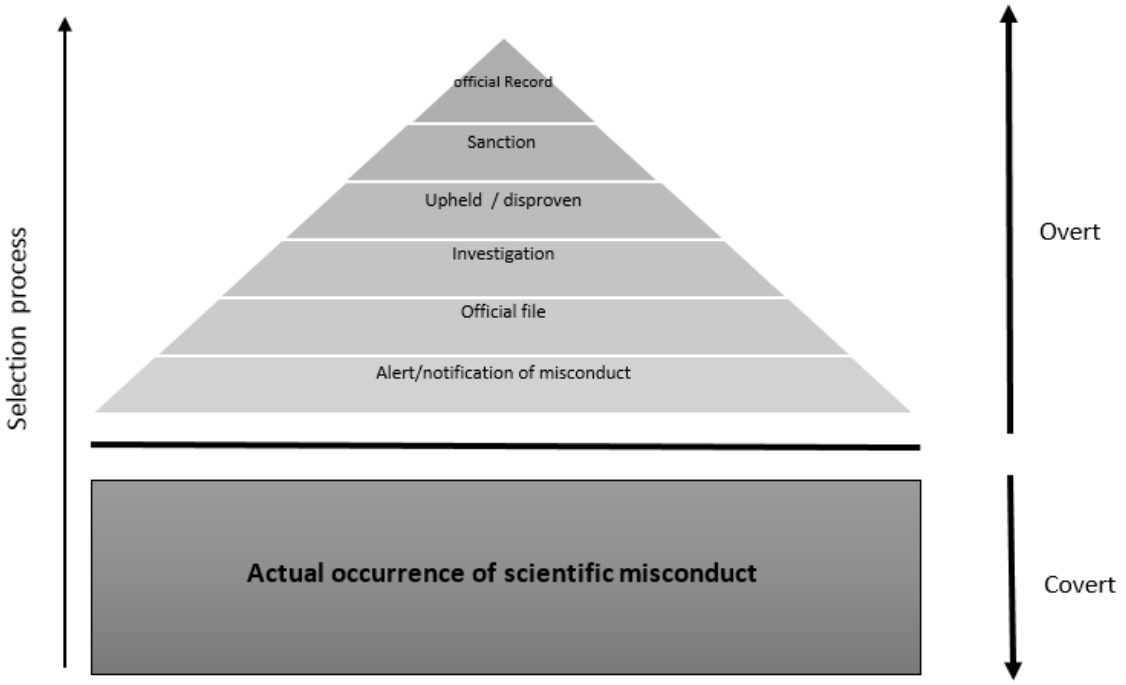
After all, the process of reporting allegations of misconduct depends almost entirely on the will of colleagues, co-workers or other peers, sometimes called whistle blowers. There is evidence supporting the hypothesis that many people who became aware of scientific misconduct in their direct environment refrain from reporting it to an official body for investigating cases of misconduct (e.g. Martin, 2013; Rivlin, 2004). The reasons for not reporting incidents of misconduct are diverse, being for example the (non) seriousness of the deviation, nature of the relationship to the offender, power imbalances and fear of severe consequences of reporting such as reputational or career damage (Gross, 2016). These reasons for not reporting are interesting because they disclose something about the situation and therefore about the character of scientific practice, as well as about the possibilities of the self-regulating mechanism part of everyday scientific practices.

Besides issues related to discovery, detection and reporting, distortions or selection may also occur at the level of the 'recording'. This step is necessary for the allegation of misconduct to become an official statistical unit (Coleman and Mouynihan, 2009). The reasons as to why reported allegations would not end up in the statistical records of misconduct in science can be numerous. Again, we can assume that some parallels are possible with the production of crime statistics coming from for example police units. For starters, official units, either being commissions for scientific integrity or overarching integrity offices might classify some behaviour differently from the way whistle-blowers or scientific departments define or describe them. The reporting of a case often needs to meet regulatory formal requirements. When someone does not meet these requirements (for example complaints reported anonymously), it will not be considered or registered as an official (and registered!) report. There could also be insufficient evidence brought forward to make the allegation to be true, after which the case can be considered closed or non-admissible, sometimes causing it to remain unregistered and thus absent from the official records. It is also possible that reported allegations of breaches of integrity or misconduct are first to be treated in a more informal way through mediation supported by a neutral moderator (ombudsperson?) and therefore being 'informally resolved'. Hence, some commissions or universities might proscribe that cases can (or need to be) be 'mediated', consequently such cases could remain un-registered and therefore not visible in official data on misconduct.

Hence, even though detected and reported upon, not all allegations will end up in some kind of official record. This will consequently result in an underestimation of misconduct when based on official data.

The criminological terminology to describe this underestimation resulting from unreported or unregistered facts, is called the dark number or dark figure3 of crime, an issue that has been crucial in the discipline of criminology throughout its short history (Coleman and Mouynihan, 2009). Biderman and Reiss (1967) state that official crime rates are "not some objectively observable universe of 'criminal acts', but rather those events defined, captured, and processed as such by some institutional mechanism" (Biderman and Reiss, 1967: 1). Therefore, an overview of the institutional reaction to misconduct in science should ideally consider how the reported facts move through a procedural chain and where they are narrowed down in the selection process from allegations of misconduct to cases that have been upheld and officially investigated and (!) confirmed. An institution has the power to sift out certain events that have been brought to her knowledge, this in accordance with the official (often investigative) procedures that have been installed. "Each procedural step is so selective that the 'visible tip of the iceberg of crime' looks progressively different from the huge submerged mass" (Biderman and Reiss, 1967: 4). This procedural chain or selection process has been a subject of study in police statistics, and we believe these selection processes may occur in administrative procedures installed at research institutes as well. Hence, the question we must ask ourselves is; from what moment on 'deviance' or 'misconduct' in science is recorded or when (and with what qualification) it is registered in the official statistics? The criteria that influence this process are defined by the registering organisation itself. So, "rates of deviance constructed by the use of statistics routinely issued by these agencies are social facts *par excellence*" (Kitsuse and Cicourel, 1963: 139).

3 For a definition of ‚dark figure', see for example Biderman AD and Reiss AJ. (1967) On exploring the" dark figure" of crime. *The Annals of the American Academy of Political and Social Science* 374(1): 1-15.: „occurrences that by some criteria are called crime, yet are not registered in the statistics of whatever agency was the source of the data being used". Ibid.



Official statistics on misconduct can influence the reputation of research institutions. In the literature it is reported that institutions will accordingly attempt to 'kill the crimes on the book' (See Biderman and Reiss, 1967: 6). By dealing with cases of misconduct in an informal way, institutions minimise reputational damage. This might also be a reason why some institutions refrain from making their annual cases public, or from granting access to their data. On the contrary higher figures of misconduct in science reported by an institution do not necessarily point to more misconduct, but could rather indicate greater transparency. Whistle-blowers might feel more confident to report, and commissions for scientific integrity or integrity offices might be more accessible to the research community thanks to for example adequate awareness raising on the issue. Nevertheless, reputation is an underestimated but important player in the social reaction to scientific misconduct.

Transparency is an important notion promoted at the European policy level as it provides the research community with an honest and legitimate image. In its survey report, Science Europe recommends that "Research Funding Organisations and Research Performing Organisations should make public the outcomes of all proven cases of research misconduct", and further, that they should "support the central collection of data on research integrity, including data on cases – either under investigation or proven" (ScienceEurope, 2016: 5). However, this plea for transparency is a somewhat naïve perspective on integrity breaches and misconduct as a social phenomenon part of everyday scientific and academic practices. Hence, scientific misconduct often remains a phenomenon that is kept hidden.

2.2.2 Measuring the occurrence of misconduct through self-report studies

With the awareness of the limitations of official figures of crime or misconduct came new ways of assessing the extent of deviance. In the field of criminology these new ways of quantifying crime boomed from the 1960s onwards and could be distinguished in *self-report* surveys and *victimisation* surveys (Coleman and Mouynihan, 2009). We have already mentioned the arrival of the self-report studies in the field of scientific integrity earlier, and will discuss the limitations of such methods here. Self-report studies typically suggest that a specific form of 'crime' (in this case misconduct in science) is much more common than what is measured in official statistics, hereby giving us insights in the hidden chunk of the metaphorical iceberg. Opinions about the value of self-report surveys differ and even though they are believed to have contributed significantly to documenting the failures and biases of official statistics, scientists remain sceptical about the data obtained in such studies.

In criminology these methods are believed to have had interesting contributions on for example the notion that 'offending behaviour is far more widespread in the population than was once supposed, and that the 'offender' cannot be so clearly distinguished as a minority with certain key characteristics as was once thought" (Coleman and Mouynihan, 2009: 67). In particular it seems to be an interesting method to measure behaviour that is considered to be deviant, but is not classified as a serious offence. It has therefore been an innovative way to research 'deviant' behaviour or status offences4 committed by juveniles as 'less serious acts' that are unlikely to end up in official records (Box, 1981).

When applied to research on white-collar criminals, persistent and serious offenders, self-report studies have not always been considered satisfactory (Weitekamp, 1989). This could explain why in self-report studies misconducting researchers have shown higher rates of questionable research practices in comparison to the more serious offences such as falsification, fabrication and plagiarism. Even though these surveys are anonymous, researchers might refrain from reporting serious offences as they fear the consequences of the possible discovery of their identity. Even though non-response from more serious offenders would allow us to assume an underestimation of the actual prevalence of misconduct (Fanelli, 2009; Martinson et al., 2005), asking researchers about observed behaviours in their research environment could lead to over-reporting, overestimations and double counts. If researchers are asked to report on incidents of misconduct they have witnessed in their direct research environment, a higher

4 Status offences as defined by The Sage Dictionary of Criminology: "the violation of formal or informal rules which are applied only to certain sections of society. The focus is less on the offence itself and more on who commits it" (McLaughlin and Muncie, 2006: 117).

percentage indicates to have observed such practices in the recent past (see 2.1). On the one hand, this could point to scientific misconduct as a pervasive phenomenon, distressing the scientific enterprise on a large scale. On the other hand, however, these findings can reveal underlying and complex tensions of contemporary scientific practice in the background of a knowledge economy. They could point to respondent's interpretations of contemporary scientific practice where confrontations are experienced between 'responsible conduct of research' and the difficulties attached to doing science in the pure sense of the word.

Unfortunately, we can only speculate on such notions, as empirical data on the effectiveness and contribution of self-report studies in the context of scientific integrity and misconduct are lacking, making it difficult to assess the relevance of studies as such for this field.

2.2.3 Conceptual challenges – are we measuring the same thing?

Practices of measuring scientific misconduct (government statistics, retraction rates and self-reports) suffer from and are affected by the lack of generally accepted definitions. They often do not measure the same thing as different interpretations of misconduct in science are applied over several scientific studies (Hesselmann et al., 2014).

In their administrative procedures, most European research institutes adhere to the European Code of Conduct launched by ALLEA and the ESF in 2011, and revised in 2017 (ALLEA, 2017).5 According to the 2011 version , research misconduct can appear in the following forms: "*Fabrication (making up results and recording them as if they were real), falsification (manipulating research processes or changing or omitting data), plagiarism (the appropriation of other people's material without giving proper credit; other forms of misconduct include failure to meet clear ethical and legal requirements such as misrepresentation of interests, breach of confidentiality, lack of informed consent and abuse of research subjects or materials. Misconduct also includes improper dealing with infringements, such as attempts to cover up misconduct and reprisals on whistle blowers; minor misdemeanours may not lead to formal investigations, but are just as damaging given their probable frequency, and should be corrected by teachers and mentors."* (ESF and ALLEA, 2011). The new ALLEA code details, apart from the classical serious FFP misconduct, with more emphasis "violations of good research practice that damage the integrity of the research process or of researchers" (p. 8). Follows a list of "examples of other unacceptable practices

5 http://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf

(…) but are not confined to …" (p. 8-9). The list of "examples" is interesting, but not exhaustive and therefore the "grey zone" remains.

Although this code is considered to be the standard in Europe, it can be noted that national contexts differ, and accordingly so do the definitions of misconduct in science. Several countries that are participating to this deliverable have published their own codes of conduct, most of them referring to the European standards, but nevertheless, discrepancies occur. Moreover, policies concerning the 'handling of misconduct cases' in research institutes vary from one institution to the other.

When reflecting upon the above-mentioned definition of the European Code, one could state that ambiguous concepts such as '*other forms of misconduct'* or *'minor misdemeanours'* can be interpreted differently according to the national, institutional and even discipline context. When is a case treated as a case of scientific integrity, and thus included in the registration? According to Godecharle et al. there is no consensus when it comes to research integrity guidance at the European level. Moreover, misconduct in science is perceived differently throughout the continent resulting in a confusing situation when it comes to the *right* approaches to this issue (Godecharle et al., 2014). This divergence complexifies the picture and makes empirical research on the subject at an overarching European level problematic. In the next section, the aim is to explore some of the elements that cause a polarised situation.

Concepts such as integrity and misconduct in science have changed and variations in discourses can be found throughout the past decades (Shamoo and Resnik, 2003). One particular aspect in these discussions has remained the subject of intense debates, being the controversy over (in) definitions of misconduct and integrity in science. This conceptual discussion is not only embedded in policy documents or the academic literature on the subject, but infiltrates into processes of registration as well. Conceptual debates have an impact on how *registering bodies* define the behaviours that are being brought to their attention in formal complaints. This is particularly interesting when *grey zone* behaviours are brought to the attention of a *registering body.* These more or less subtle behaviours, often located somewhere between responsible conduct of research and outright misconduct or fraud, might not always result into formal complaints and could remain – justly or not - unaccounted for in official statistics.

Reflecting on the scientific literature on definitions of scientific misconduct, we could state that it is exactly this *grey area* that causes most confusion in the scientific enterprise. We believe it can be assumed that the same conceptual debates are held at the level of the (institutional/national) commissions dealing with cases of misconduct. When a possible breach of scientific integrity is being filed to an investigative body, decisions must be made on the admissibility of the complaint. Besides gathering 'evidence' to prove the

allegation, commissions try to gather information on the intent of the 'accused' as this is an essential element in deciding about the merits of a case.

Another element impeding this process is the plurality in scientific disciplines. "The more or less subtle forms of misconduct such as for example the removal of unwelcomed data in order to report positive results in line with the hypothesis – or certain authorship related practices such as *ghost-writing, guest authorship, honorary authorship, self-plagiarism or redundant publication* could be considered misconduct in some disciplines, but then again they are sometimes accepted in other disciplines and contexts"(Van Buggenhout and Christiaens, 2016) .

Besides the plurality of disciplines, the adherence to a broad or a narrow approach has important consequences for registration practices. Narrow definitions are limited to the inclusion of FFP as worst behaviours while broader definitions include questionable research practices, sloppy science or even unethical behaviours that are not always linked to research practice (e.g. Hackett, 1994; Halffman and Radder, 2015; Resnik and Steward, 2012). The broad approach is intended to reflect on ethics and to provide the ability to include a wide variety of *unethical* behaviours into the discussion of scientific integrity (Hackett, 1994). A disadvantage of this approach, however, could be that definitions become too remote from daily practices of scientific knowledge production. It also entails the risk that many procedures will be instigated for cases that might be relatively unimportant and that have nothing to do with breaches of integrity. Therefore authors like Resnik and Steward (2012) have argued to distinguish between concerns over misconduct and ethical concerns, as they are not the same thing. Unintended mistakes can be harmful and might question the responsibility of the concerned, but do not necessarily fall under the label of misconduct (Resnik, 2003; Resnik and Steward, 2012). In legal systems, this amounts to the fundamental difference between civil and criminal liability. Another objection against the broadness approach derives from a prominent level of haziness as to which behaviours deserve a proper investigation, disapproval or even punishment. On the contrary, some may argue that adhering to a strict definition will lead to the exclusion of an extensive range of severe integrity issues (beyond FFP) from proper inspection.

Whether to include questionable practices into the definition of misconduct remains to a certain extent outside of the discussion we are trying to illustrate in this work. Questionable and sloppy research practices cause an erosion of the constraints of good scientific practice, but answering the question if they are "misconduct" or a "violation of scientific integrity" depends in part on the intention, the "moral element"

of the misdemeanour (Gutwirth and Christiaens, 2014; Schuyt, 2014a; Schuyt, 2014b)6. Moreover, a specific questionable research practice in one discipline or research domain can be a legitimate or accepted research practice in another discipline. Or as formulated by Steneck: "Practices that deviate significantly from the "rules, regulations, guidelines, and commonly accepted professional codes or norms for the responsible conduct of research" […] can compromise and are currently compromising the integrity of publicly funded research" (Steneck, 2000: 7). The question we could hereby ask ourselves is if and to what extent these questionable practices show up in administrative procedures? This is something we would like to keep in mind for the following sections of this report.

3 Incidence of misconduct (researched)

3.1 Protocol of the study

The exploration of prevalence of misconduct through an understanding of organisational responses is of utmost importance when we try to uncover some of the pertinent issues of contemporary sciences. To get information on the extent of misconduct, institutional responses and official registration practices are necessary sources, as it is through institutional response as such that misconduct becomes visible, and gets registered, qualified and defined. Hence, an understanding of registration practices of scientific misconduct and the accessibility to institutional empirical data is indispensable.

From the organisational data provided from the Printeger partners, the aim is to document the number of misconduct cases visible through the procedures of *a body for investigating cases of misconduct*7. This will allow for an understanding of the procedural chain that is followed in cases of misconduct and how the 'number' of cases narrows down in the selection process from alerts, notifications and complaints of misconduct to the qualification of such acts as actual misconduct in science or scientific fraud. Besides gathering knowledge on the extent of the phenomenon, it is the aim to map 'the procedures to deal with misconduct cases' and the 'registering practice' in the specific national contexts of the partners involved in this study.

Record keeping and investigations of allegations of research misconduct might be held at the level of the institution, region or country. In some countries, appeal is made to an external body, yet in other circumstances there is no formal registration system at all.

7 Referring to either a local or national Commission for Scientific Integrity, a disciplinary comity at the institutions or funding bodies, etc.

In the European Code of Conduct (2011) we can observe that it are the 'employers' of researchers, as 'hosts of the research', who primary have the duty of installing administrative procedures to deal with scientific misconduct in their research institutes. Accordingly, we can state that all institutes referring and endorsing the European Code of Conduct *should* act accordingly and therefore should have installed administrative procedures and registration of allegations of misconduct. "*Typically, the primary responsibility for promoting integrity and handling issues of research misconduct resides with the institution that hosted the research and/or is the employer of the researcher against whom an allegation of misconduct is made"* (Hiney, 2015: 17). Responsibility for governance and the investigation of scientific integrity however differs amongst the different national partners involved in this deliverable.

In the next section, we will share the key findings from the empirical data obtained from our partners. Each individual country report can be found in the attachment, including information on the registering practices of the country, the methodology used for data collection, and an elaboration of results. Due to the limited amount of systematic and comprehensive data collection on registration practices and occurrence of misconduct, we must warn the reader that these reports give us only a fragmentary indication of the scope of scientific misconduct in research institutes. Nevertheless, the results coming from these country reports allow for a reflection on crucial notions as reporting, reputational bias, selection in the qualification process, the multi-layered concept of misconduct and ultimately, the iceberg metaphor.

3.2 Results and discussion

Despite the rising academic and public attention for scientific fraud, adequate knowledge on the prevalence of misconduct in science is still unsatisfactory. In the previous sections of this work we have reflected on the limitations of official statistics, self-report and the notion of dark number. In this part, we will reflect on the gathered data and numbers we could (or not) collect and how these can be interpreted.

1. First of all, the reports confirm the diversity as to how and where data can be gathered in each country. This is to say that in some countries there is a national or "central" body (agency or committee) that monitors the procedures of universities at a national level (Netherlands, Belgium/Flanders). The Belgian case should be considered as the Flemish case, because there only Flanders and not the French-speaking community, has established an overarching committee which monitors misconduct cases reported in the Flemish institutions. Other countries do not have such a central or national overarching body. In these countries, the landscape of research institutions (universities and others) presents itself in a more scattered way (cf. UK and Estonia) and, indeed, the procedures of data gathering also differed. For the UK the data

gathering focused on a consortium of UK universities (Russell consortium) – and the UK Research Councils (research funding agencies) were selected. In Norway, although there is specific national regulation concerning scientific misconduct, universities have a high degree of autonomy in dealing with cases of research misconduct. Hence, the method of data gathering needed to address this "local" level in trying to access data through annual reports. In Estonia a similar situation was encountered, needing to address and contact all pertinent institutions. Finally, the Italian report shows that there is no central or national register of scientific misconduct cases overseeing the universities' dealing with reported cases of integrity breaches.

If we ought to make clear and consistent statements on (the incidence of) deviance in science, there is not only a necessity for a regular collection of both quantitative and qualitative knowledge, but also a demand to have access to this valuable knowledge. The level of accessibility affects the quality of the data that is being gathered as low accessibility results in poor data. Consequently, this means that all gathered data have limited value and are not representative for the (overall) incidence of registered misconduct in the included countries.

2. The research protocol and methods of data gathering suppose, of course, access to publicly available data (on websites or in annual reports). However, the country reports make clear that this supposed availability was a mistake. In many countries data are not publicly available. Especially when dealing with universities directly or even with overarching agencies it seemed rather difficult to (1) get an answer and (2) to get access to possible interesting sources (such as annual reports or overviews of reported cases). Some countries such as the Netherlands are exceptional at the level of data availability. Italy can be considered as being a completely opposite case, for not having any data available. The other involved countries are to be situated in between, but all with some degree of difficulty related to the lack of ready-made accessible data. European countries involved in this study differ strongly in the way they keep records of research misconduct. Some countries such as the Netherlands adhere to a relatively open policy concerning the public availability of the outcomes of formally processed cases of scientific misconduct. The admissible cases of misconduct brought before the national body (the LOWI) must be anonymously published on a website, creating a central registration practice that improves transparency. In the case of Norway, public research institutions are bound by *the Norwegian Freedom of Information Act,* which makes information openly available when there is a request for it. But despite these rules, it nevertheless seemed difficult to get the necessary information on cases of misconduct due to a high non-response rate. This issue of data availability

sometimes is linked to the need to improve and offer transparency. However, as we experienced in performing this research task (and the case-study task), transparency is not self-evident. In almost all countries when contacting national, local or specific committees or organisations dealing with cases of integrity breaches, the answers were prudent, very prudent, pointing at the importance of privacy, discretion or confidentiality. The importance of confidentiality cannot be underestimated. Any case of (alleged) scientific misconduct concerns reputation (honour) and bears the danger of shaming or stigmatisation of both involved researchers and institutions (which comparable to criminological research into judicial files) (see interesting reflection: Therese & Martin, 2010). As was the case for the Belgian investigation: we were asked to sign a severe Non-Disclosure Agreement for all Flemish university (and for good as well as legal reasons). 8

3. The data gathered concerned a period of five years (2011-2016). As it becomes clear when reading the country reports, that - apart from the Netherlands (and in a lesser way Flanders), the figures of reported and registered misconduct cases can in fact not be used to make statements about the extent of (registered) reported misconduct cases. The only insight these data suggest is that the *registration* of the phenomenon remains exceptional or scarce.

    a. For the Netherlands the report states that at institutional level (universities), and based on the annual reports, 171 allegations were formally reported. However, based on the same annual reports only 69 of these allegations were found admissible. At the national level, official data gathered via VSNU, indicate that since January 2011 there have been

8 Note for reflection: The main argument in favour of such academic transparency is related to the issue of legitimacy and/or trust in science (in that sense it serves a "political" goal). But, the proclaimed transparency in national or even EU guidelines is obviously not so self-evident as may seem at first glimpse. Maybe the (institutional) reluctance about transparency is not just a problem of individual reputation or shaming. In our view, we need also to take into consideration the effect transparency can have on the social reaction practices within universities or research institutions. It would be interesting to investigate how transparency (and for example media attention for certain cases) could fuel a more "punitive turn" in the social reaction and sanctioning of scientific misconduct. In this view, the plea for transparency can also be functional in pressuring or nudging institutions towards a visible (more) firm social reaction practice (cf. compare to the zero-tolerance discourse) and contribute to a rather repressive climate that oversteps the problem of fair legal procedures and guarantees.

65 admissible allegations of misconduct in the Netherlands. It is unclear why at university level 69 cases were admissible, and at the national level 65 cases were registered. This could just be an effect of timing or of non-closure of some cases. The possibility of double counts is not entirely excluded, as one case might be handled in multiple institutions.

Of these (national) 65 admissible cases 11 concerned fabrication or falsification of data, 33 involved plagiarism and 33 were about questionable research practices. Only 22 cases were found grounded and 6 'partly grounded' on the merits.

b. In Estonia gathered data are based on contacting universities and research institutes. This resulted in a partial (institutional) response of 9 reported cases. From the four universities that responded about registered allegations of misconduct (given the timeframe and focus), the report concludes that since 2012 there have been 8 cases that were categorised as 'suspicions of research misconduct'. Four of these cases were upheld, whilst the other four were found unfounded. The universities identified 3 allegations of plagiarism and 2 cases concerned questionable research practices (dual publication). Three cases were defined otherwise: (1) contesting of the PhD defence procedures, (2) exceedance of a deadline by a researcher and (3) misuse of funds.

c. The UK report shows extremely well the difficulty of mapping the registration of the reporting, registration and handling of (alleged) cases of misconduct. The overview of numerous institutions, universities and funding bodies that have no public data or annual reports available is confronting and needs to be addressed in a reflexive way. The UK exercise results in a fragmented and partial quantitative "snapshot" image of the incidence of reported scientific misconduct.

d. The Norway report sketches the difficulties of assembling a relevant and representative picture of registered incidence in a country that does have a legal framework concerning scientific integrity and misconduct. Overall, the individual institutions that responded reported seven relevant cases, and eleven relevant cases were retraced in the National Commission's annual reports from 2011 to 2014.

e. In Belgium, between 2010 and 2016, 82 complaints were formally brought to the attention of a (university) commission (CWI). Not all of these reported alleged breaches of integrity or misconduct resulted in a formal investigation, as 15 complaints were found

to be non-admissible (67 complaints were admissible). This corresponds to 18,3% of all the informal complaints that were filed. After the start-up of a formal investigation, the commissions decided upon the soundness the cases, and provided an advice to the rector of the university. In total, 32 allegations of scientific misconduct were found to be ungrounded, which means that 39% of the cases were either disproven or not qualified by the investigative commission as a breach of scientific integrity. The CWI – university commissions concluded that 28 accusations of scientific misconduct were grounded, corresponding to 34,1% of the entire sample. No information was received on the outcome of 4 complaints, and 3 cases were still being investigated at the moment of this study.

a. As already reported no data were available for Italian universities or research institutes.

4. Beyond the rather basic line of investigation aiming at dressing up an insight in "how many cases" were officially reported – prosecuted and eventually decided upon, our research protocol aimed at more detailed or descriptive information on these registered cases. Due to the problems of partial data gathering it becomes even more hazardous to present data about these characteristics of reported, admissible and grounded cases.

5. Based on the findings we can easily state that the phenomenon of officially alleged and (even more) proven misconduct is rather exceptional. The scarcity of registered misconduct, however, can be read or explored, as discussed in the previous section, in two very different ways.
On the one hand, the very low numbers of registered-reported cases are seen to suggest the opposite: a big dark number. This reading seems to represent a dominant way of considering the problem of scientific misconduct. In other words, the lack of quantitative information would allow us to assume that the visibility of misconduct in science is low, comforting the iceberg metaphor in its accuracy to describe the covert character of scientific fraud. As mentioned in the first section of this work, criminologists have been sceptical about the way official crime statistics portray the amount of crimes committed. What concerns traditional forms of crime (theft, burglary or rape for example), the dark figure is considered to be relatively small, compared to crimes of the powerful such as for example organizational and environmental crime, financial crime and corruption (Walburg, 2015). The dark number rate of the latter forms of crime are thought to be very high and there are numerous possible explanations for this. It is possible to reflect on these elements, known from the literature on white collar and corporate crime, in the light of the phenomenon of

scientific misconduct as well. First, there is often the lack of directly identifiable individual victims that can bring breaches to the attention. Secondly, other than for "ordinary" offenses there is no agreement on clear-cut definitions, especially regarding the grey areas of white-collar crime. Further, victims or employers are known to be reluctant to contact the police (Walburg, 2015). In the context of science, detection of misconduct happens (needs to happen) through the 'self-corrective' mechanisms embedded in everyday scientific practices: promoters, colleagues, co-workers or peers, whom in a collaborative or constructive but "sceptical" examination of each other's work can bring problematic scientific behaviour in an early stage under the attention. Consequently, the willingness to report has a high impact on what ultimately will end up in the official records.

On the other hand, the fact that so few cases are officially registered can also be understood as an indication that (1) misconduct is not a (quantitatively) big problem and/or (2) that these types of behaviour or conflicts are dealt with in an informal way within teams or institutions, and eventually as part of administrative employment regulations and procedures. Nonetheless, we believe it is necessary to handle these notions critically and to further explore the elements that can explain why these data are so limited, fragmentary and difficult to access. A qualitative approach might be indicated.

6. Transparency can be characterised as a core and generic element of the scientific practice as such, meaning that any scientist, group of scientists and the whole scientific community must make visible and controllable where the acquired scientific knowledge comes from, who deserves the proper credit for it, and what methodological steps have been followed. Apparently, some expect similar levels of transparency of research institutes concerning scientific policy and practices, including errors, mistakes and even openness about the occurrence of misconduct or fraud. Although the principle of openness, honesty and transparency is recognized and promoted in local, national and international guidelines and integrity codes, we all clearly encountered barriers when it came to gain access, even for research purposes, to precisely these case files and decision-making processes. In the country report of Italy, it is stated that access to information on alleged cases of misconduct was denied: "due to confidentiality issues and the limited trustworthiness of the data". In Belgium, similar discourses were held stating that for

'reasons of confidentiality,' access could only be granted if the institutions names were to stay anonymous, so that the amount of misconduct cases per university would remain untraceable.[9]

7. For scientific misconduct to be registered (in official records), detection or naming is not sufficient: it needs to be reported to an official and competent authority. As with crime statistics, the central issue of registered versus dark number "offenses" resides in the *willingness* of people, victims, or witnesses and, in our case, academic peers to report incidents of scientific misconduct to competent authorities. The question we then need to raise is: what makes 'witnesses' or peers to refrain from reporting suspicions of scientific misconduct?

8. Criminological literature on the willingness to report can be interesting for our issue (Carrabine, E., et.al. 2014: 31-33; Newburn, T., 2007: 56-60). A first crucial factor for not reporting an offense is that the behaviour is not seen or considered to be problematic (not as an offense as for example drug use). This indicates that people do not always think or qualify behaviour as problematic, but even as understandable or acceptable. A second important criminological insight is that people do not report an offense (to the police) because they don't trust the way the report will be handled, is taken serious or can result in a satisfying follow up. A third interesting insight is that people are not willing to report punishable behaviour, when they are themselves vulnerable for prosecution. Reporting an offense cannot be done anonymously (within our regimes), which entails always a certain relational personal risk. Moreover, criminological research shows that for some conflicts the notions of offender and victim are not so clear-cut as often presented, but sometimes depend on who makes the first move to report the conflict (to the authorities) formalising that way its role as victim (Cheval et al., 2011: 126). Moreover, not every reported incident can or must be qualified as actual misconduct. Due to the fuzzy and fluctuating boundaries of scientific acceptability, many behaviours might even be handled (better?) early and informally. The willingness of peers to report misconduct is an important and critical factor in the understanding of official figures of breaches of scientific integrity and misconduct. The process indeed always starts with 'the recognition' of an incident as a breach of integrity. But it is often unclear from what moment on

[9] Note for reflection: When addressing the issue of access, two separate discussions can get entangled, being on the one hand a discourse on universities communication policies to the public and, on the other hand, the possibility of making possible research on (the social reaction upon) scientific misconduct (and therefore granting scientists access to empirical data for research purposes).

behaviours can or should be considered as sloppy science, unacceptable or questionable practices or even flagrant frauds. Misconduct and fraud in science are not sharply defined and they are not formally written down in codes and laws, creating uncertainty in the scientific community. Forms of falsification, fabrication or plagiarism are relatively easy to recognize as flagrant fraud, and an observer will feel less restrained in reporting such behaviour as misconduct. When detecting dubious conduct, one has to make some own interpretative decisions. Is the behaviour part of those obscure practices in science that are to be considered sloppy, or necessary to survive the contemporary and harsh scientific context? Or do they really cross some significant borders, making the behaviour not only bad science, but unacceptable as well? The absence of (systematic) willingness of reporting could be a possible explanation for the limited amount of officially registered cases of misconduct in the country reports. It could also be a possible explanation of how breaches of integrity are part of the daily scientific practices of scientists and academics: just let the informal self-regulating and self-correcting character of scientific knowledge production move on, and frauds will be detected, absorbed and processed away. Hence, "blowing the whistle" about a fellow scientist's doings is far from evident and can have severe consequences for both the whistle-blower as the one who is being accused (see on whistle blowers in government agencies: Alford, 2002). Therefore, suspicions of wrongdoing alone might not be sufficient, and witnesses may feel the need to have direct evidence before taking further steps. Those who have come across questionable behaviours might be willing to turn a blind eye and either deal with the issue informally, without notifying a dean or responsible official. The consequences of reporting can be harsh for everybody involved, the "plaintiff" as well as the accused (and the scientists appointed to be member of integrity commissions). These consequences range from reputational damage, to deteriorated relations at work, consequences for the advancement of the academic career, etc. As said before, it seems to us an underestimated and under-researched characteristic of the issue at stake.

4 Conclusion

Measuring the incidence of scientific misconduct poses challenges. These challenges have previously been documented in academic literature on the subject, but also in incidence of crime studies in criminology. This is of course no surprise. This is complex: it demands the considering of diverse registration practices, heterogeneous conceptualisations, dissimilar communication and different accessibility policies for data gathering at the European level.

Consequently, a challenge resides in the (National - European) development of registration practices making basic statistical data available (and accessible) that can give a less fragmented description of the (officially and formally recognised) cases of scientific misconduct. The country reports not only show the (data) disparity between countries, but also within one national context. The development of a (European) registration practice could take into account a minimal set of descriptive parameters, making at least basic description and comparison (over disciplines, countries, and time) possible. This registration practice should take into account the difference between "reported" allegations of misconduct and confirmed cases of scientific misconduct. But even with this (European) registration practice implemented, other difficulties, but above all important questions need to be considered carefully.

As discussed, we tried to "measure" a registered phenomenon that is not legally or strictly defined. The codification of reproachable or penalised forms of scientific misconduct is not available, and we need to honestly and openly reflect on the why's and how's of such a codification, even if the conclusion turns out to be that there is no need for such initiative. The un(der)defined concept of scientific fraud or misconduct, reinforced by national and disciplinary differences, at any rate disables a comparative approach (between institutions and countries) to be almost ineffectual. This is even more so for those grey and unclear doings labelled as questionable research practices.

Given that there is no policing or "prosecuting" body – and luckily so! – charged with the hands-on detection scientific misdemeanours, the construction of official incidence figures depends entirely on peers who report peers, bringing alleged scientific (mis)behaviour under the attention of a disciplinary authority in their institution. We discussed the relationship between registered and non-registered or dark number figures, and pointed at the crucial element of the willingness to report. In our opinion, this willingness is the key-switch between informal and formal dealing with problematic scientific practices.

Further, we have tried to show that the interpretations of scientific misconduct are situational. Researchers can differ strongly about this and interpret and re-interpret the practical characteristics of daily scientific practice. That means that predetermined normative frameworks and measuring instruments (such as self-

report studies) do not necessarily define or measure what they want due to divergent interpretations made by the respondent-scientists in different fields.

Our investigation into registered incidence of scientific misconduct and integrity breaches shows that the phenomenon is to be considered as an exceptional and even scarce one. However, it demonstrates above all that the institutional registration practice is far from systematic and even rather unprofessional. In general, there is a lack of publicly available (institutional) data on integrity breaches and misconduct. This is in a way rather surprising when one considers the sometimes high-pitched (policy/institutional) discourses on scientific integrity, ethics and academic values.

Finally, this research task brought also forward the issue of transparency at an institutional academic level. As we discussed, the lack of publicly available data can be linked to a lack of (necessary) transparency. However, transparency is not self-evident. Researching scientific misconduct and integrity is confronted with the utter importance of confidentiality, precisely because of the devastating effect of stigmatisation and shaming. It might be somewhat ironic, but doing research into (the social reaction to) scientific misconduct is met by gatekeepers and involved academics in a very cautious way. Moreover, this rather difficult research experience obliges us to reflect fundamentally on the necessity (and function) of this (academic) transparency, especially in the light of "punitive" reactions and fair legal procedures and guarantees.

> "Because science is an innovative and ever-changing endeavour, the meaning of misbehaviour is permanently shifting and frequently readdressed and renegotiated within the scientific community. Quantitative approaches alone are thus hardly able to accurately portray this dynamic phenomenon." (Hesselman, 2014: 61)

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Attachment - Country Reports

These results are retrieved from the individual reports of the partners involved in this deliverable. Due to the specific context of each country, we decided to keep these results separate and discuss them country per country. Further, we would like to emphasise that a systematic comparison between these countries is currently not desirable due to the discrepancies and fragmentation in regulatory policies and registration practices.

1. The Netherlands

1.1 Research misconduct in the Netherlands and its registration

According to agreements among Dutch universities data on allegations of misconduct are stored centrally at the *Vereniging van Nederlandse Samenwerkende Universiteiten* (VSNU). In case of an allegation of misconduct, local authorities at the various universities decide whether an allegation is admissible or not. In case of an admissible allegation, a local committee will investigate the case and report its conclusions to the directory board of the institute. The directory board then decides on the official statement and consequences regarding the case. This latter report by the university's directory board is published (anonymised) at the webpage of the VSNU. The research institutes are obliged to report the admissible cases of alleged misconduct to the VSNU. These reports do not have a standardized format but commonly include information on: the year in which a case happened, the institutions involved, the form of misconduct and whether the allegation was found grounded.

1.2 Data collection method

While gathering information for WP3.1 we will include all reports on the VSNU webpage published between January 1st 2011 and the date of data collection (November 1st, 2016). Information from these reports was obtained through careful reading. In this we strived to obtain as much information as possible. For example, information about the scientific position, gender, age, etc. of the actors involved is not presented in the reports, to assure anonymity. However, in some cases we were able to retrieve some of this information through the context of the case (for instance in cases in which it becomes clear allegations concern a (non-defended) PhD thesis).

In addition, in 2013 the VSNU and its registered bodies announced that the institutions would be starting to publish data on scientific misconduct in their annual reports. This publication is not obligatory and no specification of the data or the format was given. Multiple institutes have however responded to this announcement and now publish data on the number of allegations regarding scientific integrity. For some

universities, these data resemble the data available at the VSNU webpage, but others decided to also publish the number of allegations that were deemed inadmissible. All annual reports from the period 2011-2015 were gathered and all information regarding the number of allegations was collected.

Because all stored data concerning the number of cases concerning (alleged) misconduct are publicly available, there were little difficulties during data gathering. To check whether the information at the VSNU webpage was complete we contacted both the VNSU, to verify whether all reported cases were published at the webpage, as well as our local institution, to verify whether all allegations were reported to VSNU. Both confirmed that all available data was reported and subsequently published.

With regard to the data collection via the annual reports we note that only little data is available from the years prior to 2013 (consulting our own institution showed that data from this period is not only not published, it is genuinely no longer available). In addition, two of the universities (TU Delft and Tilburg University) do not provide information regarding the incidence of (alleged) misconduct at their universities.

1.3 Results

From the official data gathered via VSNU, we conclude that since January 2011 there have been 65 admissible allegations of misconduct in the Netherlands. From these 22 were found grounded and 6 were deemed 'partly grounded' (grounded in some aspects of the allegation, ungrounded in others).

In all of the reported cases, we were able to retrieve information about the year in which the allegation took place, the form of misconduct that concerned and whether the allegation was deemed admissible and/or grounded. In addition, in the majority of the cases we were able to obtain information on the institution involved and the scientific position of the accused and/or the plaintiff.

In addition, we gathered information on the incidence of misconduct via the institutions annual reports. In the annual report, the institutions report a total of 69 admissible allegations from 2011 onwards. Because information on the concerned institution is not for all allegations published at VSNU available, we cannot check why the numbers (65 vs. 69) differ. It could be that, despite the VSNU and the institutions claiming that information is complete, there are some cases not (yet) reported at VSNU. Another potential explanation is that some institutions might be reporting about one single case of (alleged) misconduct in several annual reports (for example because the investigation takes place in more than one academic year). Lastly, there can have been several cases of admissible allegations that did not reach the stage of directory board's decision, for example because allegations were withdrawn during investigation or because the actors managed to solve the case without directory board's intervention. In such cases, allegations are not reported to VSNU.

The data from the annual reports in addition shows that there have been 171 formal allegations of scientific misconduct in the past 5 years. This shows that a relatively small number of allegations is deemed admissible, while the majority (102 out of 171, 60 %) is not admissible.

The data gathered via VSNU provides additional data on the form of misconduct. From this we conclude that 11 cases deal with allegations of falsification and/or fabrication of data, 33 cases concern plagiarism and again 33 deal with allegations of Questionable Research Practices or other forms of misconduct. The data from the annual reports does not provide information about this aspect of the allegation.

2. Estonia

2.1 Research misconduct in Estonia and its registration

In Estonia on the national level there is no body for registration of research misconduct cases. At the moment, *Estonian Code of Conduct for Research Integrity* is being worked out with the involvement of Estonian universities as well as other research institutions. This process was initiated by the Estonian Research Council. *Estonian Code of Conduct for Research Integrity* is complementing the *Code of Ethics for Estonian Scientists* that was compiled in 2002.

The main aim of the new document is to promote research integrity in Estonia and therefore it does not focus on the specific procedural rules regarding the research misconduct cases. It is expected that every research institution will develop those rules individually.

Currently, the registration and investigation of the misconduct cases is being done by ad hoc method at the level of institutions.

2.2 Data collection method

Our approach towards finding out the official ways in which research misconduct cases are addressed in Estonia is based on our best knowledge that there is no national body for registering and investigating such cases and probably there are no such bodies at the institutional level. Keeping in mind the overall aim of the PRINTEGER project we considered it necessary to find confirmation to our information about how institutions deal with already happened (or suspicion of) research misconduct cases – if there are any informal or semi-official practices that institutions are willing to share and how many and what kind of cases are processed during last five years. For that reason the main research funding organisation was contacted and asked if and on what level misconduct cases are registered in Estonia. The letter addressed to the contact person of Estonian Research Council in Estonian contained following questions:

1. On what level does the registration of research misconduct case take place? At the level of the research institutions or at the national level (Estonian Research Council)? In addition:
    a. How many cases are registered each year?
    b. How many of them have been officially filed?
    c. What has been the outcome of these investigations?
    d. What was the nature of these cases?
2. Do registering bodies or committees have an obligation to report the registered cases, for example, in the form of annual reports? How public is this information?

3. What kind of scientific misconduct cases have been investigated?

The response we gained from the Estonian Research Council was close to what we thought it would be. According to the contact person: "There is no common agreement on what level to deal with research misconduct cases and therefore, it is usually in the jurisdiction of each research institution and this means all the information about cases is in those institutions."[10]

Secondly, we sent the same questions to the Ministry of Education and Research, which governs some research and development institutions in Estonia, and to the Archimedes Foundation that mediates European Structural Funds for researchers and doctoral students. The response from those organizations contained information that registration of research misconduct cases does not belong to their domain.

Therefore, we got confirmation that there is no national body assigned to register misconduct cases and the information about those cases is distributed among various research institutions. Consequently, we sent e-mails with similar questions to all Estonian research institutions that are positively evaluated (except for the Estonian IT College, because their main field of activity is to provide applied higher education and this college is evaluated on other grounds).[11] Emails were sent to 19 research institutions (see attachment).

We received a reply from 14 out of 19 institutions including 6 universities. Some of the answers were partial. Some of these institutions do not have an official body that deals solely with scientific misconduct but there are departments or officials that will have the obligation to investigate or make a decision if something unethical happens. However, it has to be taken into account that the finding that there are no harmonized administrative procedures agreed upon does not exclude the possibility that our results are not comprehensive and contain substantial gaps in describing academic reality in Estonia. We can rely on good will of the representatives of research institutions but it is not clear how informed the officials are who responded.

[10] Extract from our e-mail exchange

[11] There are more institutions that do research in Estonia but the choice of positively evaluated institutions was based on the fact that those institutions have the right to apply for:

- "funding from the state budget for one's research and development projects on the conditions specified in the Organisation of Research and Development Act;
- Opening a doctoral studies programme in the respective field on the conditions specified in the Universities Act."(The website of the Estonian Ministry of Education and Research, last modified February 25, 2016, https://www.hm.ee/et/tegevused/teadus/evalveerimine).

The possibility to organize studies on PhD level raises the probability that the institution is willing to think through different ways to prevent research misconduct, investigate already happened cases, and instruct young scientists about the good conduct of research.

2.3 Results

2.3.1 Who is responsible for registration of misconduct cases inside the institution?

The general conclusion from e-mail responses can be drawn that registration and keeping record of misconduct cases, itself is not an aim of any substructure or officer. Research institutions either try to proactively prevent plagiarism and fabrication or solve already happened incidents case by case. This probably means that when some incident is discovered, it is dealt with at a lower level (e.g. research group, department or faculty) and information about it does not go any higher and so it is not possible to collect all the cases. Among the departments or officials identified as responsible for dealing with suspected misconduct the respondents mentioned:

- Academic commission of the University
- Immediate supervisor (e.g. leader of the research group, director of the research institute, leader of the faculty or member of the rectorate)
- Vice rector for research and for more serious cases – academic commission.
- Research director
- Academic court
- Vice rectors of academic affairs or research; if necessary, Commission of Research.
- Ethics Committee or Board of Research
- Research Secretary
- Research Secretary or Head of Human Resources
- Director or board
- Two respondents did not specify who is responsible for dealing with misconduct cases in their institution.
- In two responses were indicated that they do not have any such body or department in their institution.

There is not any special registering or analysing system of misconduct cases worked out in any respondent institution. Still, there are some documents that regulate among other things also part of the issues of research ethics. As our aim was to collect information about research misconduct we limited our focus to researchers and doctoral students. However, it is worth mentioning that respondent universities mentioned official procedures that concern bachelor or master students' written works. At this level, the prevention of plagiarism and dealing with suspicions of it is more clearly regulated and sanctions are specified. The responsible department in those cases is usually department of academic affairs. Marking this point is important as it gives some indications about what is the scope of definition of misconduct in Estonia.

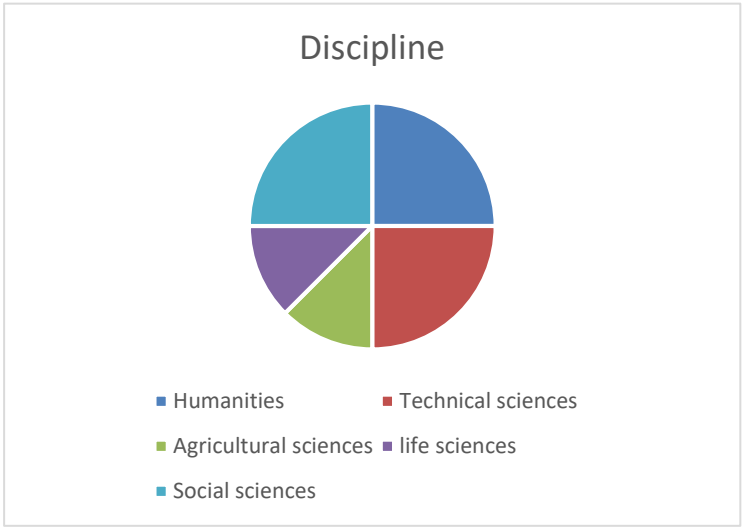
2.3.2 Description of cases

In this section, we will give an overview of the misconduct incidents. As there were no databases of misconduct incidents we refer to them not as files but as cases. We eliminated from the list one description of an incident that took place in the year 2008 and one plagiarism case concerning a master thesis because these fall out of our specific focus.

There is no overarching or national body responsible for registration, processing and keeping record of research misconduct cases. Nor are there such bodies in research institutions. But there are either officials or subunits whose responsibility among other things is to process such cases if these occur. The research institutions which are not universities reported zero instances of research misconduct during the period of last five years.

From the four universities that have gave information on registered allegations of misconduct (given the timeframe and focus), we conclude that since 2012 there have been 8 cases that were categorised as 'suspicions of research misconduct'. Four of these cases were upheld, whilst the other four were found ungrounded. The universities identified three allegations of plagiarism and two cases concerned questionable research practices (dual publication). Three cases were defined otherwise: (1) contesting of the PhD defence procedures, (2) exceedance of a deadline by a researcher and (3) misuse of funds.

Besides the nature of the reported facts, it was possible to gather information on additional parameters such as the discipline in which the allegation of fraud was located. In the specific case of Estonia, and considering the few (8) cases that we have obtained information from, we can state that there was not one single discipline that is overrepresented.



Further, it was possible to receive some information on characteristics of both the complainant and the accused.

Of the cases brought to the attention of the regulating body, most official complaints came from academics with the status of professor, whereas 6 out of the 8 allegations were directed towards PhD students. The size of the sample does not allow us, however to make any generalisations on this matter.

The absence of centralized bodies of registering or keeping the record of misconduct cases in our academic institutions makes it difficult to estimate how complete is the information herein and it can be probably presumed that there are some cases that are processed and solved in local/sub-structural level of the organisations with minimum public disclosure.

3 Norway

3.1 Research misconduct and its registration in Norway

On the national level in Norway, the handling of research misconduct accusation is primarily regulated through *The Act Relating to Ethics and Integrity in Research (Research Ethics Act)*[12]. Even though there are regulations on the national level, cases are mostly handled on the local level, by the institutions themselves. The institutions have a high degree of autonomy when it comes to handling such cases, and do their own investigations. They are also responsible for punishing any misconduct they uncover.

This autonomy has contributed to a high diversity of practices. Some institutions have ethics committees that handle misconduct cases, while others handle such cases ad hoc. The institutions are not required to report accusations of misconduct locally or to any central institution, and information about misconduct cases is therefore not readily available. In one instance, the Norwegian University for Science and Technology, Norway's largest university, the responsibility is decentralized even further. This institution reported that handling misconduct is the responsibility of the different faculties, and that the central/top level therefore had little knowledge about the universities' practices or instances of misconduct.

Norway has a National Commission for the Investigation of Research Misconduct[13]. Its mandate is to be a national resource for institutions and private companies in cases of misconduct, and to supplement institutions in the handling of such cases. This commission handles some cases, mostly by request from the institutions, when the case is especially hard, there are conflicts of interest or the case has gotten a lot of public attention. The commission can also handle cases on its own initiative, but it is not in its mandate to sanction those they find to be guilty of misconduct. That responsibility rests on the institutions, and it is up to them to decide what to do with the commission's conclusions. As the Commission only has a supplementary role, they send most of the cases that is reported to them back to the institution where the alleged misconduct took place.

The Norwegian government is currently debating a proposal for a new law on the organization of research ethics, and this law is expected to be adopted in the spring of 2017. In the current proposal for this law, the institutions are required to report suspicions of serious breaches with scientific norms to the National Commission. Other standardizations of handling misconduct cases are also proposed. The institutions will have to adopt standardized routines, and they will have to introduce integrity measures like research

[12] https://lovdata.no/dokument/NL/lov/2006-06-30-56
[13] https://www.etikkom.no/en/our-work/about-us/the-national-commission-for-the-investigation-of-research-misconduct/

ethical guidelines and training in research ethics. When this new law is enacted, the availability and transparency of data on misconduct will increase significantly.

3.2 Data collection method

In Norway, there are 90 institutions that have research as one of its main activities, and that receives public funding. The high degree of autonomy and low degree of standardization among the institutions made the data collection challenging. We decided to limit the selection to public institutions. Public institutions are subject to the Norwegian Freedom of Information Act, which makes the information we were after in principle publicly available by request. The private institutions are under no obligation to divulge such information, and getting access to their information would therefore be a too taxing process. We also excluded the military research institutions. While these are also in principle subjected to the freedom of information act, their web sites cite restrictions on doing research on data from the military institutions without first acquiring permission, something we did not have the opportunity to get or dispute due to time constrains.

After having limited the amount of institutions using parameters described above, we were left with 26. Our next step was to search the web sites of these institutions for information about cases of misconduct. A few of the institutions had some information available, for example in the protocols of the institutions' board of directors, but only one of the institutions, the University of Stavanger (UiS), had the information we were after readily and systematically available. UiS has a designated group for handling accusations of research misconduct, and their reports and protocols from their meetings are available online[14].

As very little information was available at the institutions' websites, we sent a freedom of information request to all the selected institutions, where we requested information on all accusations of misconduct reported the last five years. We specifically stated that we did not want sensitive information, as this would need approval from each individual institution, which would be too time consuming for this project. Under the freedom of information act, one does not need any type of approval, as the information is already defined as public.

In addition to the institutional data, we also collected the cases handled by the National Commission for the Investigation of Research Misconduct. Initially, we wanted to exclude this data, as it creates a lot of noise. Due to anonymization, it is impossible to determine whether the institutions in question are among the ones we have selected for this data gathering. Some cases mentioned explicitly that the institutions in question were museums, governmental agencies, NGOs or research institutes, and we could therefore exclude these, but many of the cases do not mention what type of institution was involved, or whether or

[14] http://ansatt.uis.no/forskning/forskningsetikk/forskningsetisk_utvalg/article7888-3791.html

not the institution was private or public. It is therefore possible that some of the cases included fall outside the perimeters we have set for this data collection.

It is also impossible to determine which cases overlap with the cases we gathered from the institutions. It is therefore important to consider the two sources, the institutional responses, and the reports from the National Commission, as different. They should be used separately, as combining them will probably lead to the same cases being recorded twice. The National Commission also report on cases they hear about informally, but since such cases are not handled in any official way, we excluded them in this report.

If all the institutions included in this data collection had responded to our request, the data from the National Commission would have been redundant, as these two sources overlap. Since only around half of the institutions responded, we included the data from the commission as a supplement.

Before requesting the data from the institutions, we had some worries about how we would be perceived. Research misconduct is a potential risk for the reputation of the institutions, and they might therefore be reluctant towards handing us the information, even though it is in principle public. We were also concerned that the institutions might feel threatened by our request, and this would be unwanted, as they are potential users of the results. Because of these worries, we used a mild language in our data request, and we avoided referring to the Freedom of Information Act explicitly. This act is active regardless of whether one refers to it, so this did not reduce the strength of our request.

At the time of writing, only 10 of the 26 institutions that were selected have responded. This kind of request should according to the law, and legal precedent, be answered within a brief time. Therefore, we now have options for filing formal complaints with the institutions that have not responded. When it comes to the transparency of the Norwegian system, our conclusion is that it is transparent in principle, but also that there are problems in practice. Non-responses is a transparency issue. It is also a problem that one needs to request the information from the institutions directly. Sending emails to, and corresponding with, 26 research institutions takes some effort. The combination of lacking responsiveness and the effort it takes to request the information makes it difficult to conclude that the system is transparent at the present time. As mentioned above, this will be improved with the new law.

A few of the respondents commented on our data gathering. These comments were positive towards the project, and expressed a positive attitude towards more focus on research ethics.

3.3 Results

We divide the results by institution, as they are diverse because of the low level of standardization when it comes to how these cases are handled. We attached the spreadsheet VUB provided in our freedom of information request, but none of the respondents utilized it.

After the institutional responses, we have included the cases handled by the National Commission for the Investigation of Research Misconduct, as found in their yearly report[15]. Overall, the institutions reported seven relevant cases, and we found eleven relevant cases in the National Commission's annual reports from 2011 to 2014.

3.3.1 Institutional responses

From 2012 until 2016, the 10 institutions that responded reported upon a total of 7 cases. The outcome from one case was unknown, 3 cases were found to be grounded, 1 case was disproven and 2 cases were currently under investigation. All the allegations of misconduct were related to plagiarism.

3.3.2 National Commission

From the yearly reports of the National Commission it was possible to retrieve information on 11 cases. Seven cases were found admissible. After a preliminary investigation by the commission, all cases were found ungrounded. The commission did not instigate a full investigation for all the cases, but redirected the handling of the cases to the level of the institutions on several occasions. In other instances, the accusations were either found to be undocumented and later withdrawn or qualified as cases of 'low scientific quality'. In one occasion, the commission declared that it does not deal with small breaches of good research practices nor does it make decisions in cases of professional disagreement.

[15] https://www.etikkom.no/hvem-er-vi-og-hva-gjor-vi/Hvem-er-vi/Granskingsutvalget/
The reports from 2015 and 2016 are not yet available

4. Belgium

4.1 Research misconduct in Belgium and its registration

There is no central registering body that deals with all breaches of integrity in Belgium, as well as no public records of misconduct cases. When it comes to registration of misconduct cases, procedures and registration practices differ according to the region and the research institution. From 2010 onwards there has been a significant effort, mainly coming from the research institutions installed at the Flemish region, to put in place official investigative bodies that are able to decide upon the soundness of breaches of integrity. These efforts have been objectified in the installation of the so called 'Commissions for Scientific Integrity' (CWI) at the five Flemish Universities[16]. Some minor differences in procedures can be determined between these commissions, but on a generic level we may say that these bodies function according to similar principles as there have been regular consultations between them in order to (up until some extent) 'unify' the ways in which allegations are dealt with. We will shortly narrate on the main characteristics of these commissions:

A CWI is presided by a chairman and vice-chairman[17], accompanied by three or more provisional members (these are usually experts in the specific disciplinary field of the case in question). A Commission of Scientific Integrity investigates a case within a 'reasonable period' and formulates an advice to the rector about the soundness of a case. The committee does not give an opinion or advice about sanctioning measures. To decide upon the soundness of a case, these commission adhere to the 'code of ethics for scientific research in Belgium'[18] and the specific procedures and guidelines applicable in the codes and procedures of the university in question. The scope of their competence is limited to researches that were employed at their university at the time of the events, everything that relates to students is not part of their competence.

In case a complaint is filed at a funding institution (for example the FWO, research foundation), the funding institution will take notice, but will immediately redirect the investigation to the CWI of the particular research institution (as the host of the research), as they have a bilateral agreement in which the commission grants expertise.

[16] Universiteit Antwerpen (CWI since 2010), Vrije Universiteit Brussel (CWI since 2015), Katholieke Universiteit Leuven (since 2006), Universiteit Hasselt, Universiteit Gent (since 2011)
[17] In general there is also the assistance of a lawyer
[18] This code was written in a context of broader European movements, and used publications by the OECD, ESF, the European Commission and the Dutch "Gedragscode Wetenschapsbeoefening" as important sources. For an English version of the code: https://www.kuleuven.be/english/research/integrity/practices/belspo-code

Besides these 'local' commissions, there is another overarching commission that has been established by the Koninklijke Vlaamse Academie van België (Royal Flemish Academy of Belgium). The Flemish Commission for Scientific Integrity establishment (VCWI) is qualified to provide a second advice on the cases that have been investigated by the CWI's. The VCWI provides general information or a specific advice when this is requested by a CWI (for example in case of doubt). When a decision has to be made on the soundness of a case, this commission also relies on the code of ethics for scientific research in Belgium[19].

There are no official Commissions for Scientific Integrity installed in the French speaking region of Belgium. It is therefore difficult to assess whether and how allegations of misconduct are dealt with by universities of the French speaking community.

4.2 Data collection method

Due to the difficulties in gathering data on incidence in the French speaking community, we have redirected the data collection towards the five Flemish Universities. The commissions installed at these universities adhere to similar principles which would allow us to accumulate data on cases they have received over the past 5 years.

We started by making informal phone calls to both the secretary of the VCWI and the secretaries of the CWI's, asking them about the operations and procedures of their commissions. During these phone calls we discussed the objectives of this deliverable and we explored the possibilities of getting access to data on allegations of misconduct. As mentioned above, the VCWI provides second advices when a CWI expresses the need for it, data obtained by the VCWI would only give us a select image of the total amount of formal allegations of misconduct in these institutions. Because there is no central registration of cases it was most appropriate to collaborate with the commissions on a local level.

We invited all involved and interested parties at our Local Stakeholders Panel and provided them with in-depth information on the aims of this task. Administrative procedures and transparency in registration of misconduct was the main topic on the agenda. We agreed on specific confidentiality measures such as for example the accumulation of data in one dataset, so that the institutions themselves would not be identifiable in the results. The data analysis was thus performed on the accumulated set, making it impossible to trace back the connection of specific cases to any of these five research institutions.

A data gathering sheet was send out to the secretaries of the commissions and we requested data on the following parameters:

[19] http://www.kvab.be/vcwi/pdf/VCWI-reglement.pdf

- Admissibility of a complaint
- Nature of the reported facts: FFP, QRP, Other, with the possibility to include specifics on the case. The addition of specific behaviours listed under the 'QRP' or 'other' section allowed us to gather interesting information on what had been considered by the CWI as cases of QRP.
- Characteristics of the notifying party (complainant) and the concerned party (accused). We asked the commissions to indicate the status (Prof, PhD, non-academic, academic staff, editor, etc.) and gender of the people involved, as well as the scientific discipline in which the allegation took place.
- Soundness of the case: was the case considered grounded or ungrounded by the commission
- If known, we also asked to fill in the outcome of the case.

There are some weaknesses and difficulties that need to be mentioned here. Firstly, not all commissions were installed simultaneously at the universities. Therefore, some commissions have data from 2009 onwards, whilst others were not able to provide us any numbers before the year 2013 or even later, causing some gaps in the data collection. Secondly, these commissions have no collective statistics or system for data storage. Consequently, they had to go through each file separately and look for the parameters that we were interested in. This might cause distortions and inaccuracies. Thirdly, due to the sensitive topic and confidentiality issues, we experienced some reluctance what was concerned data on the discipline, status and gender of the people involved. Eventually all five Flemish universities filled out the data sheets that were provided by us.

4.3 Results

We have managed to obtain official data on cases of misconduct at each Commission of Scientific Integrity installed at the Flemish universities, from the moment they have been operational. These official numbers allow us to report upon the procedural chain that is being followed by these commissions, how cases are being qualified after formal investigations. One CWI was able to provide us with cases from 2009 onwards, the other commissions started to record cases in 2010 or later.

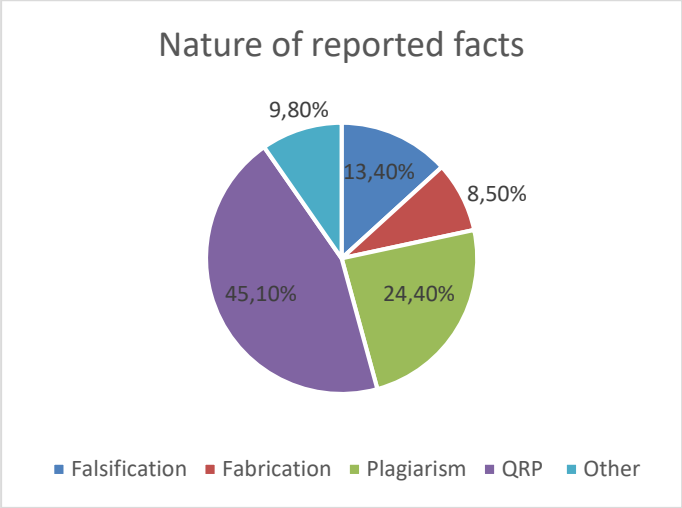
We have obtained information from a total of 82 complaints that were formally brought to the attention of a commission. Not all of these instances resulted in a formal investigation, as 15 complaints were found to be non-admissible, this corresponds to 18,3% of all the informal complaints that were filed.

After the start-up of a formal investigation, the commission decides upon the soundness of a case, and provides an advice to the rector of the university. In total, 32 allegations of scientific misconduct were found to be ungrounded, which means that 39% of the cases were either disproven or not classified by the investigative commission as a breach of scientific integrity. The commission concluded that 28 accusations of scientific misconduct were grounded, corresponding to 34,1% of the entire sample. We did

not receive information on the outcome of 4 complaints, and 3 cases were still being investigated at the moment of this study.

4.3.1 Nature of reported facts

From the data on the nature of the reported facts we can state that 11 cases related to falsification, 7 to fabrication of data and 20 cases concerned plagiarism. Overall, a total of 37 complaints related to questionable research practices and 8 cases were listed under the 'other' category.



In order to get a grasp on how the commission qualified questionable research practices, we provided the opportunity to insert a specified label in the dataset. Most institutions specified the behaviours that had occurred and that were qualified under the 'QRP' or 'other' category:

QRP's further specified by CWI	Occurence
Selective publication of positive results only	1
Conflict of interest	4
Ghost authorship	5
Ghift authorship	2
Disputed authorship	12
Questonable methods	1
Sloppiness	1
Copyright infriction	2
Self plagiarism	1
Dual publication	1
Intellectual property infringement	1
No ethical approval	1
Not specified	3

"others" column further specified	Occurence
Unlawful usage of data in a publication	1
Unscientific' communication on scientific fora	1
Questions arose about the progress of a PhD	1
Independence of academic research	1

Falsification/fabrication in curriculum for job application	1
Systematic irregularities	1
Failure of agreements between funder and scholar	1
Not specified	1

In total, there have been 38 allegations of scientific misconduct that related to FFP. After an investigation of the commissions installed at the Flemish universities, 21 cases (55,3 %) were qualified and confirmed as such by the commission. Of all the falsification cases (N 11), 5 cases were found to be grounded after an investigation by the commission. Looking at the total number of allegations of fabrication (N 7), we can state that 3 cases were proven and thus qualified as fabrication by the commission. Of all 20 plagiarism cases, 13 were upheld by the investigative body

What the questionable research practices and 'other' category is concerned, we can state that of all formal complaints, 13 cases (31,7%) were found grounded and thus recognized and qualified by the investigative commission as cases of QRP. We can thus state that, in comparison to FFP cases, more allegations of questionable behaviour (QRPs) are sifted out as they move through the procedural chain.

Based on these numbers we can say formal appearance of misconduct in science seems to be much lower than the actual number of cases that have been reported as not all of them are qualified as cases of scientific integrity by the investigative commission.

5. Italy

5.1 Research misconduct in Italy and its registration

Italy does not have national register for misconduct cases in scientific research, nor do universities have an institutional one. We need to consider that research integrity is still a relatively new issue in the Italian research integrity debate. The first national guidelines for research integrity were drafted in June 2015. Before that, other guidelines were released in the same year by the University of Naples Federico II.

As predictable on the basis of these circumstances, there is no register of cases of fraud or misbehavior in science yet. In order to confirm the state of our knowledge on the topic, we contacted the biggest research organization in Italy, the Italian National Research Council (CNR). There were no other institutions contacted, because CNR is acting as a 'hub' for research integrity in Italy. The CNR has installed a local committee which, after time should become a committee on the national level. In addition to the guidelines previously cited, CNR has a *Commission* for the Ethics of the Research and the Bioethics that deals with reports of suspected cases of misconduct both in relation to its own research centers and upon request of other research organizations and universities.

5.2 Data collection method

In order to obtain more information on registering practices, an interview was conducted with the Coordinator of the Commission. It was confirmed to us that no register or data about cases of misconduct is yet available; in addition, the Commission is bound confidentiality in examining and reporting upon all submitted cases of potential misconduct (including those submitted to the Commission by other research organizations and universities). It was also emphasized that the circulating data are just estimations and that they cannot be considered trustworthy for research purposes. Further, it became clear that the CNR is planning to undertake a systematic analysis of all the publications from the last five years written by CNR researchers in order to detect potential cases of plagiarism, manipulation of images, data falsification, and biased interpretations of statistical outcomes.

5.3 Results

Although there is no data about the incidence of misconduct available, it is possible reflect on what guidelines and protocols research institutions use in dealing with misconduct.

6. Great Britain

6.1 Summary

In the UK there is no centralised organization or regulatory body who collects data on incidence of research misconduct and, there is currently no specific legislation governing research misconduct (Godlee & Wager, 2012). However, at the time of writing (Spring 2017), the Science and Technology Committee (a House of Commons Select Committee) is conducting an inquiry into the topic of Research Integrity including whether there should be legislation to deal with scientific misconduct.

In the UK, misconduct in research is dealt with as an employment disciplinary issue by individual institutions. This means that details about research misconduct are strictly confidential. However, in the Higher Education sector the introduction of the UK 'Concordat to Support Research Integrity' in 2012, set out guidelines which includes the recommendation that Higher Education Institutions (HEIs) should publish annual data on their formal investigations into research misconduct (Gibney, 2015). Indeed, from 2013, major funders in the UK have required universities to comply with the Concordat in order to receive funding (ibid). However, research conducted by Elizabeth Wager for UKRIO has found that compliance with this recommendation among universities has been low (in Gibney, 2015; Smith, 2015).

To map incidence of research misconduct in the UK for this report we have focused on the higher education sector. We have chosen to sample the Russell Group, a consortium of 24 research intensive

institutions (Russell Group, no date). We have collected data about incidence of misconduct at these institutions through investigating annual statements on research integrity which are publically available, covering the time period of 2013-2016. Furthermore, we have collected data from the Research Councils UK (RCUK) who have been conducting annual audits of funded institutions (including HEIs beyond the Russell Group) which span the time period 2011-2016. This report does not provide data on incidence of research misconduct in the private sector, although from discussions with UK research integrity experts, reference to potential sources for this information is made.

In line with the findings of Elizabeth Wager's research, it was not possible to locate the Annual Statements on Research Integrity for all of the 24 Russell Group institutions. Furthermore, it was found that the data collected in both the individual annual statements and the RCUK audit reports of is patchy in detail, and limited in scope, providing only a snapshot of allegations of misconduct in the UK. Problems in locating individual annual statements may be due to the limitations in the search methods utlilised in this project, but this also demonstrates that these statements are not necessarily easy to find; something that was highlighted by Wager in her research (Gibney, 2015; Smith, 2015). Furthermore, Wager highlights that there will be differences in how institutions define what counts as a formal investigation which leads to some institutions reporting no incidents (Gibney, 2015). This needs to be accounted for when considering the data. Institutions also differ in the level of detail about individual cases that are reported in terms of describing types of misconduct or specifying outcomes. Moreover, due to the confidential nature of dealing with cases of misconduct in the UK, there is very little data about perpetrators and none at all about accusers. Nevertheless, without a centralised register of incidence of misconduct in the UK, these sources of data provide a useful inkling about cases of misconduct in the Higher Education sector.

6.2 Methods

To tackle this research task we took a number of approaches. First to ascertain the UK situation and identify how instances of research misconduct are recorded in the UK we sought advice from a number of individuals with expertise in this area. Initially, we contacted the Head of Research Governance at our institution (the University of Bristol). Our second expert sources were the two individuals identified as UK contacts in the extent and incidence of misconduct research protocol: Marc Taylor, the UK representative for European Network for Research Integrity Offices (ENRIO) and James Parry the Chief Executive of UKRIO. We wrote to these two individuals requesting advice and subsequently held telephone meetings with each.

The discussions with the three research integrity experts confirmed the current situation in the UK, where there exists no centralised organisation that deals with or records incidence of research misconduct. Instead, cases of misconduct are dealt with at an institutional level as an employment conduct issue. It was highlighted that coincidentally at the time of this research (Spring 2017), the Science and Technology Committee (a House of Commons Select Committee) is conducting an inquiry into the topic of Research Integrity including whether specific legislation should be introduced to deal with scientific misconduct. However, it was noted that in the UK there is some resistance to this and concerns that regulation will not adequately deal with the problem of misconduct; something that is reported in a recent Note for the Parliamentary Office of Science and Technology (PN 544, 2017: 3).

The experts also highlighted that in the UK, recording and reporting of incidence of misconduct by Higher Education Institutes (HEIs) is a relatively recent occurrence stemming from the introduction of the 'UK Concordat to support Research Integrity' published in 2012. Most UK universities have signed up to the Concordat and, in order to comply with it, they are compelled to report cases of misconduct and publish annual statements of research integrity (Gibney, 2015; Smith, 2015). Furthermore, since 2013 compliance with the concordat has been required by major funders of research in HEIs in the UK (ibid). However, it was acknowledged by the experts that we spoke to that interpretation and application of the Concordat differs between institutions. An issue that is highlighted in research conducted by Wager for UKRIO and presented at their annual conference in 2015 (reported by Gibney, 2015; Smith, 2015). Also, importantly, how misconduct is defined varies between institutions, although many draw upon the Medical Research Council and Wellcome Trust definitions, differences in defining misconduct may be particularly problematic in 'grey areas' such as questionable research practices. It is important to be aware of these differences when considering the incidence data that is reported. Indeed, Wager's research suggests that in some cases variations in how misconduct is defined, or what counts as a 'misconduct investigation' leads to underreporting in Annual Statements of Research Integrity published by universities (Gibney, 2015).

There were a number of other notable issues identified through our discussion with our expert contacts. First, it was highlighted that in the UK there is a tendency to focus on misconduct in terms of public harms from pharmaceuticals and medical devices research. However, this focus may differ in other countries: Japan was provided as an example where nuclear and engineering research are areas of prominent concern regarding the effects of research on public health. Second, the experts stressed the role that

research culture plays in many cases of misconduct in the UK, identifying the 'publish or perish' culture, competition and vulnerabilities of junior researchers due to exploitation or lack of mentoring as problematic. Indeed these issues are highlighted in a report examining research culture published by the Nuffield Council on Bioethics in 2014. Third, the patchy and incomplete nature of data reporting incidence of misconduct in the UK was emphasised. However, it was thought that incomplete data was still an issue for countries where regulatory routes to deal with misconduct exist (such as the United States of America), whereby, gaps and failures to report could be attributed to a range of reasons. Finally, since misconduct is dealt with on a private, institutional level in the UK, this means that details about cases of research misconduct are strictly confidential. Nevertheless, a number of potential sources of data indicating the extent and incidence of research misconduct in the UK were identified (see Table 1 below):

Table 1: List of potential data sources

Potential data source	Type of organisation	Format of data	Investigated for this report	Data found?
UKRIO	Independent Charity/ advisory capacity	Reports of enquiries or cases dealt with	Yes	Data not available
Higher Education institutes	UK universities and colleges dealing with higher education	Reports of cases of misconduct detailed in Annual Research Integrity Statements	Yes, sample: Russell Group	Patchy, incomplete data available
Research Councils UK (RCUK)	Strategic partnership of main research councils in the UK	Reports of cases of misconduct detailed in annual narrative statement on research integrity	Yes	Patchy, incomplete data available/ limited scope
Committee On Publication Ethics (COPE)	Committee for editors and publishers of peer review journals, advises on dealing with cases of research and publication misconduct	May have some data on misconduct cases through inquiries made for their advisory service	No	Not confirmed
Health Research Authority (HRA)	Body of the Department of Health to "protect and promote interests of the public in health and social care research" (HRA, no date) in line	Potential that the organisation collects data regarding NHS research misconduct	No	Not confirmed

	with the Care Act 2014			
Medicines and Healthcare products Regulatory Agency (MHRA)	Government organisation involved in regulation of clinical trials	Collects data about 'near misses' in clinical trials so may have information about issues relating to cases of research misconduct	No	Not confirmed
Professional bodies e.g. Royal Statistical Society	Organisations representing professionals	Professional bodies may collect data about research misconduct in their discipline. In particular the Royal Statistical Society may have an interest in appropriate use of statistics	No	Not confirmed
Association of the British Pharmaceutical Industry (ABPI)	Organisation representing large, medium and small research-based pharmaceutical companies	Potential that the organisation may have access to data about cases of research misconduct in this sector	No	Not confirmed

Due to time constraints it was not possible to follow up all of the potential sources of data on incidence of research misconduct identified by the experts we consulted with. Therefore, it is unconfirmed whether any such data is collected by these organisations, and if it is, whether this data is easily accessible to external individuals/organisations. The results of the three potential data sources (UKRIO, HEIs and RCUK) about the extent and incidence of misconduct in the UK investigated for this research are detailed below.

6.3 Results

Investigation of UKRIO as a potential data source:

United Kingdom Research Integrity Office (UKRIO) was outlined as a potential source of data on research misconduct by the Head of Research Governance at the University of Bristol. UKRIO was founded in 2006 and acts as an advisory body on research integrity issues which is open to anyone who has concerns about research integrity or misconduct, including members of the public. As a charitable organization, UKRIO is funded through its members, who include both UK and foreign research institutions, mainly from the higher education sector, including the Russell Group[20]. UKRIO has no regulatory authority. The organisation specifies that it has three aims (UKRIO, no date):

1. "Promote the good governance, management and conduct of academic, scientific and medical research."
2. "Share good practice on how to address poor practice, misconduct and unethical behaviour."
3. "Give confidential, independent and expert advice on specific research projects, cases, problems and issues."

It was mooted therefore, that since UKRIO handles enquiries and is involved in dealing with specific cases of alleged misconduct, the organisation could have data or produce reports indicating the incidence of misconduct encountered.

To investigate this avenue of potential data, we searched the UKRIO website for any reports outlining this information, but were not successful. Subsequently, we were also able to consult with UKRIO's Chief Executive James Parry and Marc Taylor (who is Vice Chair and a trustee of UKRIO), who both confirmed that the organisation did not collect statistical data about incidence of misconduct or publish such information. Furthermore, James Parry highlighted that since UKRIO operated in an advisory capacity, individuals and organisations are not obliged to contact them, resulting in them only having a snapshot of misconduct cases. Moreover, in specific cases where UKRIO provides expert advice, they function as a facilitator, linking experts from their member organisations with those who require advice. These cases are then dealt with confidentially, therefore UKRIO do not obtain any information regarding case outcomes.

UK Higher Education Institutes (HEIs):

Universities UK, the representative organisation for UK universities report that in 2014-15 164 HEIs were in receipt of public funding through one of the research councils in the UK (Universities UK, No Date). Due to the large number of HEIs based in the UK, it was decided that to investigate a sample of these for this task. The Russell Group, a consortium of 24 of the UK's leading universities from all four countries (England, Scotland, Wales and Northern Ireland) was decided upon to meet these aims because this group are research-intensive institutions with strong links to both public and private

[20] Please see: http://ukrio.org/our-subscribers/

sectors, commanding a large proportion of the research funding available in the UK (Russell Group, no date).

To investigate the extent and incidence of misconduct reported by Russell Group institutions, we first set upon exploring the webpages of each university to locate their annual statement of research integrity as recommended in the UK Concordat, to which compliance is required by the main UK research funders. Annual statements of Research Integrity have arisen from the introduction of the UK concordat, therefore this search will cover the years 2013-2016. This web based search was conducted during February 2017 and detailed in Table 2 below:

Table 2: Findings from the Russell Group

University of Birmingham	We found one annual statement of Research Integrity statement (2013-14). No later statements or reports appeared to be available online.
University of Bristol	We found one annual statement of research integrity (available for 2015). No other statements or reports appeared to be available online.
University of Cambridge	We found three annual research integrity reports (2013-14, 2014-15, and 2015-16).
Cardiff University	We could not find any research integrity statement or other reports of misconduct incidents via searching the website directly or through Google.
Durham University	We could not find any research integrity statement or other reports of misconduct incidents via searching the website directly or through Google. However, information from the University's Research Office is in a password protected area which may contain this data.
University of Edinburgh	We found one research ethics and integrity report (dated May 2016). No other statements or reports appeared to be available online.
University of Exeter	We found one Statement on Research Integrity (2015-16) No other statements or reports appeared to be available online.
University of Glasgow	We found two statements on Research Integrity (2014-15 and 2015-16). No other statements or reports appeared to be available online.
Imperial College London	We could not find any research integrity statement or other reports of misconduct incidents via searching the website directly or through Google.
Kings College London	We could not find any research integrity statement or other reports of misconduct incidents via searching the website directly or through Google.

University of Leeds	We could not find any research integrity statement or other reports of misconduct incidents via searching the website directly or through Google.
University of Liverpool	We could not find any research integrity statement or other reports of misconduct incidents via searching the website directly or through Google.
London School of Economics and Political Science	We could not find any research integrity statement or other reports of misconduct incidents via searching the website directly or through Google.
University of Manchester	We could not find any research integrity statement or other reports of misconduct incidents via searching the website directly or through Google.
Newcastle University	We could not find any research integrity statement or other reports of misconduct incidents via searching the website directly or through Google.
University of Nottingham	We found two statements of research integrity (2014-2015 and 2015-2016). No other statements or reports appeared to be available online.
University of Oxford	We found 3 statements on research integrity (2014-2016) available. No other statements or reports appeared to be available online.
Queen Mary University of London	We could not find any research integrity statement or other reports of misconduct incidents via searching the website directly or through Google.
Queen's University Belfast	Search on research integrity: We found three statements of research integrity (2013-16) available.
University of Sheffield	We found one statement on research integrity (2016) available. No other statements or reports appeared to be available online.
University of Southampton	We found one statement on research integrity dated 2016 Covering the period of 2013-Dec2015. No other statements or reports appeared to be available online.
University College London	We found one a statement on research integrity (2014-15), covering the years 2013-15. No other statements or reports appeared to be available online.
University of Warwick	We found two statements of research integrity covering the years 2013-2015. No other statements or reports appeared to be available online.
University of York	We found three statements of research integrity that we could access (2012-13, 2013-14 and 2014-15. There was a link to the report

	for 2015-16, but cannot access this as requires a UoYork log-on.

The data collected from each annual statement found have been entered onto the Russell Group spreadsheet (Appendix 1). 14 out of the 24 Russell Group institutions have conducted at least one annual written statement on research integrity (including an overview of cases of misconduct dealt with) during the time period of 2013-2016. However, reporting of misconduct is a relatively recent occurrence, and HEIs have adopted this new policy at different rates (Gibney, 2015). Which is demonstrable in the data collected, where there exists variation in the years reported upon by each university. Only two out of the 24 institutions had data available about misconduct for the full-time period investigated (2013-2016). Furthermore, for 10 of the universities no statements appear to be available at all. It was quite surprising to find such variation in the availability of annual statements and reporting of incidence amongst Russell Group institutions (despite Wager's research indicating high levels of institutions failing to publish this information (Gibney, 2015; Smith, 2015)), since they are research-intensive and rely heavily upon major UK funders who stipulate adherence to the UK Concordat. However, there are a number of issues that need to be acknowledged when considering this element of the data collected.

It is a possibility that the 10 institutions where we were unable to find annual reports on research integrity simply name these reports differently or only make them available internally, therefore rendering them hard to locate or unavailable external investigators. Nevertheless, in searching for these reports we used a number of search terms, via both google and website search options. Furthermore, we thoroughly explored the 'research integrity' and 'research governance' webpages of these institutions, since this is where these reports were located at the universities where they were available. Alternatively, these institutions may just be slow or cautious to undertake the new requirements of the concordat, an issue highlighted in Wager's research (Gibney, 2015).

Another issue that requires consideration when examining the data is the variability in reporting between institutions. Some statements explicitly state whether investigations are formal or informal/preliminary, however, not all do this. Therefore, where it is not explicitly stated, we have assumed that investigations carried out are formal, and entered them as such into the spreadsheet. This assumption may not be correct, leading to some institutions appearing to have more formal investigations than others. However, Wager's research also warns of underreporting of incidents due to the way that some institutions may define what constitutes a misconduct investigation (Gibney, 2015). This suggests that reports of 'no incidents' reported in this data may also not be reliable.

Finally, there is considerable variation between statements in terms of the level of detail provided about cases regarding the types of misconduct, characteristics of the accused, whether cases were upheld or not and, with regard to information detailing outcomes/sanctions. This incomplete data makes it difficult to map the extent and incidence of misconduct across these institutions. Nevertheless, the lack of detail is not surprising due to the confidential nature of research misconduct cases in the UK, where allegations are dealt with as an employment disciplinary process by individual institutions. On the basis of outcomes in the reports the data suggests that there were 22 cases formally investigated regarding misconduct of staff and students at Russell Group institutions that proved to be grounded and, 26 cases that were found to be un-grounded, with some investigations reported as on-going.

To obtain more complete data, we had planned to contact the institutions to request data for the whole time period investigated (2013-2016). Unfortunately, we did not have time to follow through with this. Interestingly, at the time of writing, a BBC News investigation has reported about allegations of misconduct reported at Russell Group universities between the years 2011-2016 (Briggs, 2017). The report states that 'official data[21]' suggests that there were 30 allegations of research misconduct in the UK between 2012-2015 (ibid). The BBC obtained data from Russell Group institutions using the Freedom of Information Act, whereby 23 out of the 24 institutions complied in full or at least partially (ibid). They report that the data (whilst incomplete) shows that between 2011-2016 there were 319 allegations of research misconduct made against staff or research students reported (ibid). Of these allegations, 173 were dismissed, 43 were on-going investigations and 103 were upheld (including cases of plagiarism, fabrication and piracy) (ibid). Furthermore, it was found that these investigations resulted in the retraction of more than 30 research articles and at least 3 PhD theses, however the data about retractions was incomplete as not all institutions were able to provide this information (ibid).

What is clear from our investigation of the Annual Statements of Research Integrity of the Russell Group institutions, and also the BBC investigation, is that data about incidence of misconduct is often patchy and incomplete, with variation across institutions in terms of the type of information and level of detail that they are able to provide.

Research Councils UK (RCUK):

Since 2013, major funders in the UK, such as RCUK (a strategic partnership of the UKs 7 research councils) have required universities in receipt of funding to publish annual reports summarising their formal investigations into research misconduct, as part of demonstrating their compliance with the UK Concordat (Sarchet, 2013; Gibney, 2015). Furthermore, since 2013 RCUK have themselves produced a yearly narrative statement on research integrity to comply with the UK Concordat.

The RCUK narrative statement requires research organisations that receive funding from them to complete questions notifying them of formal misconduct investigations; but only those cases involving researchers or research projects funded by them. In this data collection, research organisations are only required to report formal investigations that have been concluded, and are asked for information about the types of misconduct and number of allegations that have been upheld either in whole or partially. However, research organisations are not required to provide details of the names of individuals involved. In the narrative statements themselves, whilst a list of contributors is provided, the research organisations to which specific investigations of misconduct pertain are not specified.

Four narrative statements from RCUK were located through searching their website. The information about incidence of misconduct have been summarised in Table 3 (below), which includes information about the contributors where provided, and also compiled into a spreadsheet (see appendix 2). Out of these four statements, the initial two (highlighted in the table and spreadsheet in yellow) were conducted as a pilot phase dated 2012-13 and 2013-14. In these pilot reports, whilst the number of research organisations who have contributed information is reported the names of these are not specified. This contrasts with the following two official reports, which detail contributors, although

[21] The source of this 'official data' is not clearly identified, but the article suggests that this data may come from a combination of the Research Councils UK reports and a report by Universities UK which refers to misconduct allegations across the UK, not just Russell Group institutions.

neither the pilot nor the official reports identify from which organisations the cases of misconduct originate.

Table 3: Findings from RCUK

Date of report	Research organisations included in figures	Total cases of formal investigation	Investigations – not upheld	Investigations - upheld	Still under investigation/outcome unknown
2012-2013	7 contacted for the report – not specified 3 organisations reporting formal investigations	3	0	3	0
2013-2014	15 contacted for the report – not specified 7 organisations reporting formal investigations	24	14	2	8
2014-2015 Detailing a 3 year reporting cycle (2011-12, 2012-13, 2013-14)	4 institutions out of 25 reporting formal investigations. Listed as contacted for the report: University College London, Institute of Fiscal Studies University of Hull, University West of Scotland, Institute of Education, Aston University, University of Westminster, Strathclyde University, University of Brighton, Moredon Research Institute, Southbank University, Middlesex University, Natural History Museum, University of Leeds, University of York, London Metropolitan University, London University, University of Coventry, University of Southampton, St Andrews University*, Bangor University, University of Swansea, University of Plymouth, University of Newcastle*, University of Durham, University of Lancaster*, University of Oxford, University of Reading*, University of Huddersfield*, Royal Veterinary College*, City University, Goldsmiths*, University of Bradford*, Liverpool John Moores*, University of West of England*, Institute of Food	7	6	1	0

	Research*, University of Portsmouth*, De Montfort University*. *Questionnaires were received in the final quarter of 2014/15 but carried over to 2015/16 for reporting purposes				
2015-16 (data collected from a 3 year reporting cycle: 2013-14, 2014-15, 2015-16)	1 organisation reporting formal investigation. 20 research organisations contacted listed as: University of St Andrews, University of Newcastle-upon-Tyne, University of Exeter, University of Liverpool, University of Cambridge, University of East Anglia, Aberystwyth University, King's College London, University of Edinburgh, University of Huddersfield, Coventry University, Liverpool John Moores University, The Open University, University of the West of England Bristol, Goldsmiths College, University of London, University of Portsmouth, School of Oriental and African Studies, University of Bradford, Institute of Development Studies, University of Northumbria at Newcastle.	1	0	1	0

Of the two pilot annual statements, only the first (dated 2012-13) details the types of misconduct reported, where out of 7 research organisations contacted for the report, 3 reported conducting formal investigations into: plagiarism, breach of duty of care and misuse of travel expenses, where all three allegations were admissible. Of these three cases, the only outcome reported is for the misuse of travel expenses where the money was refunded. In the second pilot report (dated 2013-14), no details about the types of misconduct or outcomes are provided. It is only reported that 7 out of 15 research organisations contacted reported formal investigations for misconduct. Out of a total of 24 allegations, only 2 were upheld, with 14 found to be non-admissible, and 8 still under investigation and the outcome still unknown. The outcomes for the two cases of misconduct that were upheld, the outcomes and any sanctions are not reported.

Each official narrative statement spans a three year data collection period. The first dated 2014-15 reports data collected in the years: 2011-2012, 2012-2013 and 2013-2014. The second dated 2015-16 reports data collected in the years 2013-14, 2014-15 and 2015-16. In the first official statement (2014-15) it can be seen that 4 institutions out of a total of 25 reported a total of 7 formal investigations of misconduct: 2

allegations of falsification, 2 allegations of plagiarism and 3 allegations of misrepresentation. Of these, only one case of falsification was upheld, although the outcome in terms of sanctions is not known. In the second official narrative statement (2015-16), only one research organisation reported a formal investigation of misconduct, an allegation of 'breach of duty of care'. This case was upheld but the outcome and whether any sanctions were applied is unknown.

Several observations can be made about the misconduct data reported in the RCUK annual statements: first, from the 'official' statements it can be concluded that during 2011-2016, of the 45 research organisations contacted, a total of 8 allegations of misconduct (concerned with RCUK funded research or researchers) were made. Out of these 8 only 2 cases were upheld. However, whilst the 'official' reports cover the time period of 2011-2016, the data collected in the pilot reports during the years 2012-13 and 2013-14 are not included in this data. Perhaps this pilot data is gathered from different research organisations to those listed as being contacted for each official statement. If this 'pilot' data was also included, this potentially includes data from a further ten research organisations, and significantly increases the figures from 8 to 35 allegations, with 7 being upheld.

Second, a limitation in the RCUK report data is that they only provide data on a small number of the research organisations who they fund for each report. The data is merely a snapshot of misconduct cases, not a full audit of misconduct allegations from across all RCUK funded research. Finally, another limitation is that the data presented lacks detail regarding the outcomes of admissible cases of misconduct and provides no information about the demographic characteristics of people accused or reporting misconduct. However, this lack of detail is perhaps not surprising given the confidential manner in which allegations of misconduct are investigated in the UK.

As a final examination of the RCUK data, we cross-referenced the institutions listed as contacted for the two official RCUK statements with members of the Russel Group. Here it was evident that 12 of the 24 institutions have contributed to the 'official' reports. However, it is not clear if any of the remaining 12 institutions were part of the earlier pilot figures. It can be seen that five of the ten Russell Group institutions that we could not locate statements of research integrity for are included as part of the RCUK figures: 2014-15: University of Leeds and University of Durham; 2015-16: University of Newcastle, University of Liverpool and Kings College London. However, it is unclear whether any of the reported allegations of misconduct pertain to any of these institutions. Moreover, of the remaining five Russell Group institutions (University of Cardiff, Imperial College London, London School of Economics and Political Science, University of Manchester and Queen Mary University of London) we cannot be certain if they were part of the two pilot statements compiled by RCUK.

6.4 Conclusions

This investigation has highlighted that mapping the extent and incidence of research misconduct in the UK is a difficult and complicated task because there is no central registry collecting such information. Data about misconduct is collected by individual research organisations, but cases are dealt with as part of an internal employment issue, therefore on a strictly confidential basis. Since 2013, after the introduction of the 'UK Concordat to support Research Integrity' in 2012, UK HEIs have been obliged to provide annual statements on research integrity to demonstrate compliance, including reporting formal investigations of research misconduct. Moreover, compliance with the Concordat is seen as obligatory by major UK funders for funding. Indeed, some funders also conduct audits of misconduct investigations relating to individual researchers or projects funded by them (e.g. RCUK annual statements). Nevertheless, the reporting misconduct data in the UK is relatively new so there appears to be individual variation in the publishing of annual statements and the ways that research organisations define what counts as a 'formal investigation'. Furthermore, since cases of research misconduct are dealt with as a matter of misconduct under the remit of employment law; cases are confidential. This means that there is scarce detail about individual cases of research misconduct included in reports.

For this investigation we obtained publically available data about research misconduct published by a sample of research intensive UK HEIs who form the Russell Group, as well as data collected by RCUK about research funded by them across a number of UK research organisations. Whilst we have managed to collect some data through these channels, this publically available data is limited and only provides a snapshot of the extent and incidence of research misconduct in the UK. Limitations of the data are due to various causes, notably the data collected lacks detail due to the manner it is reported by organisations sampled. There was also a failure to locate misconduct data from some institutions, and finally, the data collected mainly focuses on the higher education sector. Nevertheless, the data provide a small indication of the extent of misconduct in this research sector in the UK. Furthermore, we identify a number of other potential sources of data that may be fruitful to follow up to obtain a more holistic view the extent and incidence of research misconduct in the UK.

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Appendix 1. Russell Group Universities: publically available data:

Country: UK | Registering body: | no registering body - gathered via university research integrity reports from Russell Group sample

File	Year	Informal complaint	Formal complaint (Initiated cases)			Nature of the reported facts					Characteristics of the plaintiff			Characteristics of the accused			Formal complaint (Initiated case		Outcome / sanction	Institution
			Admissable	non-admissable	investigation on-going	Fals.	Fabr.	Plagiarism	QRP	Other	Professional status	discipline	gender	Professional status	Discipline	gender	grounded	un-grounded		
1	2013-14	0	3	0	0									not stated					"proportionate actions	UoBirmingham
2	2013-14	0	0	0	0									not stated						UoCambridge
3	2014-15	6	0	0	0									not stated						UoCambridge
4	2015-16	1	0	0	0									not stated					Unknown if progresse	UoCambridge
5	2015-16	0	0	0	0									not stated						UoEdinburgh
6	2015-16	0	0	1	0			1						not stated						UoExeter
7	2014-15	0	1	0	0		1							PGR student			1		Correction of thesis fo	UoGlasgow
8	2014-15	0	0	0	1			1						PGR student					Viva cancelled pendin	UoGlasgow
9	2014-15	0	0	0	1					Citation omn				Staff					investigation by journ	UoGlasgow
10	2015-16	0	1	0	0			1						PGR student			1		Correction of thesis fo	UoGlasgow
11	2015-16	0	0	0	1			1						PGR student					Unknown, still under i	UoGlasgow
12	2015-16	0	0	0	1	1								Staff & PGR students					Unknown, still under i	UoGlasgow
13	2014-15	0	1	0	0					1				PGR student			1		Written warning	UoNottingham
14	2015-16	0	1	0	0	1								Staff			1		Dismissal	UoNottingham
15	2014-16	0	0	1	0			1						PGR student				1		UoNottingham
16	2014-16	0	0	1	0			1						PGR student				1		UoNottingham
17	2014	0	0	1	0			1						staff				1	case dismissed	UoOxford
18	2014	0	0	1	0	1								staff				1	case dismissed	UoOxford
19	2014	0	0	1	0			1						staff				1	case dismissed	UoOxford
20	2014	0	1	0	0	1								staff			1		investigation occurre	UoOxford
21	2014	0	0	1	0					o attribute au				staff				1	provided with advice	UoOxford
22	2014	0	3	0	0					of others wi				staff			1		further action under c	UoOxford
23	2014	0	0	11	0			1						Student				1	cases dismissed	UoOxford
24	2014	0	0	0	1			1						Student					investigation ongoing	UoOxford
25	2014	0	1	0	0			1						Student			1		referred to student di	UoOxford
26	2014	0	0	2	0					e of own mat				student				1	case dismissed	UoOxford
27	2014	0	0	2	0				theft, unauthorise					student				1	case dismissed	UoOxford
28	2013	1	0	0	0					of former em				staff					unable to determine c	UoOxford
29	2015	0	0	1	0				ct that did not refl					Student				0	Not considered misco	UoOxford
30	2015	0	1	0	0				a source without ac					staff			1		2 articles retracted, fa	UoOxford
31	2015	0	0	1	0				e to attribute auth					staff				1	case dismissed	UoOxford
32	2015	0	0	1	0			1						staff				1	case investigated & di	UoOxford & other unnamed university
33	2015	0	0	1	0				e to attribute auth					staff				1	case dismissed but Re	UoOxford
34	2015	0	0	1	0			1						staff				1	case dismissed but Re	UoOxford
35	2015	0	0	1	0				esentation of data					staff				1	case dismissed	UoOxford
36	2015	0	0	4	0			1						students					case dismissed	UoOxford
37	2015	0	2	0	0			1						student			1		failure of work, resub	UoOxford
38	2016	0	0	1	0				sentation of data in					staff				1	case initially reported	UoOxford
39	2016	0	0	1	0			1						staff				1	honest error not misc	UoOxford
40	2016	0	0	0	1			1						staff					investigation ongoing	UoOxford
41	2016	0	0	1	0				ons of figures in jou					staff				1	anonymous reports to	UoOxford
42	2016	1	0	0	0				s concerning data c					student					outside the remit of n	UoOxford
43	2016	1	0	0	0			1						staff					deemed outside of Ux	UoOxford
44	2016	0	0	3	0			1						students					case dismissed	UoOxford
45	2016	0	0	0	1			1						student					investigation ongoing	UoOxford
46	2013-14	1	0	0	0				authorship					staff				1		QueensUniBelfast
47	2013-14	0	0	2	0				authorship					staff				1		QueensUniBelfast
48	2014-15	0	0	0	1			1						staff					investigation ongoing	QueensUniBelfast
49	2014-15	0	1	0	0					Not known				staff			1		Disciplinary process	QueensUniBelfast
50	2014-15	0	2	0	0					Not known				PGR students			1		referred to academic c	QueensUniBelfast
51	2014-15	0	0	1	0					not known				staff				1	Honest mistake, refer	QueensUniBelfast
52	2015-16	0	0	1	0					Not known				staff				1	No misconduct found,	QueensUniBelfast
53	2015-16	0	1	0	0			1						PG student	Arts, humanities and s		1		Student asked to with	QueensUniBelfast
54	2016	0	0	1	0	1	1							staff				1		UoSheffield
55	2016	0	0	0	1		1							student					investigation no comp	UoSheffield
56	2016	0	1		0		2							students			1			UoSheffield
57	2016	0	0	0	1			1						student					investigation not com	UoSheffield
58	2013-14	0	3	1	0			1						PGR students			3	1	not reported	UoSouthampton
59	2014-15	0	1	0	0	1								PGR student			1		not reported	UoSouthampton
60	2014-15	0	2	0	0			2						PGR students			2		not reported	UoSouthampton
61	2015	0	1	0	0			1						Ex member of staff			1		not reported	UoSouthampton
62	2015	0	1	0	0				i/unprofessional b					PGR student			1		not reported	UoSouthampton
63	2013-14	0	0	0	0															UCL
64	2014-15	0	1	0	0				s from someone el					not stated			1		partially upheld, actio	UCL
65	2014-15	1	0	0	0					not reported				not stated					retractions recommer	UCL
66	2013-14	0	0	0	0															UoWarwick
67	2014-15	0	no info	no info	no info									not stated					One formal investigat	UoWarwick
68	2015	0	no info	no info	no info									not stated					One formal investigat	UoBristol
69	2012-13	0	0	1	0					not reported				staff				1		UoYork
70	2013-14	0	0	1	0					not reported				PGR Student				1		UoYork
71	2014-15	1	0	0	0					not reported				staff					allegation withdrawn	UoYork
72	2014-15	0	0	1	0					not reported				staff				1	allegation investigate	UoYork & another institution
Total		13	29	47	10	6	5	27									22	26		

Appendix 2. RCUK data:

Pilot data is in yellow, official reports data in green

UK		Research Institution: 4 - not specified			Registering body: RCUK														
		Data collected by RCUK from funded higher education institutions for their annual narrative statements on research integrity - only formal investigations are recorded																	
File	Year	Informal complaint	Formal Complaint (initiated cases)			Nature of the reported facts						Characteristics of the plaintiff			Characteristics of the accused			Outcome/sanction	Institution
			Admissable	non-admissable	case on-going	Fals.	Fab.	Plagiarism	QRP	Misrep.	Other	Professional status	discipline	gender	Professional status	discipline	gender		
Cases repo	2012-13		1					1										Unknown	Unknown
	2012-13		1								Breach of duty of care							unknown	Unknown
	2012-13		1								Misuse of travel expenses							Refunded	Unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14			1															unknown
	2013-14		1															unknown	Unknown
	2013-14		1															Unknown	Unknown
	2013-14				1													Unknown	Unknown
	2013-14				1													Unknown	Unknown
	2013-14				1													Unknown	Unknown
	2013-14				1													Unknown	Unknown
	2013-14				1													Unknown	Unknown
	2013-14				1													Unknown	Unknown
	2013-14				1													Unknown	Unknown
	2013-14				1													Unknown	Unknown
Initial Reports/pilot		0	5	14	8			1			2								
1	2011-12			1						1									unknown
2	2012-13			1		1													unknown
3	2012-13		1			1												Unknown	unknown
4	2012-13			1				1											unknown
5	2012-13			1						1									unknown
6	2013-14			1				1											unknown
7	2013-14			1						1									unknown
8	2014-15		1								Breach of duty of care							Unknown	unknown
Official total		0	2	6		2		2		3	1								

Appendix 3. Inventory of national institutes

Country: UK

6.4.1 RESEARCH INSTITUTES

Research institutes	Acronym	Body for investigating and registering cases of misconduct (/ when non existent)
Higher Education Institutes:		
Aberystwyth University		
Anglia Ruskin University		
Aston University		
Bangor University		
Bath Spa University		
Birkbeck, University of London		
Birmingham City University		
Bournemouth University		
Brunel University of London		
Buckinghamshire New University		
Canterbury Christ Church University		
Cardiff Metropolitan University		
Cardiff University		
City, University of London		
Coventry University		
Cranfield University		
De Montfort University		
Durham University		
Edge Hill University		
Edinburgh Napier University		
Falmouth University		
Glasgow Caledonian University		
Glyndwr University		
Goldsmiths, University of London		
Guildhall School of Music and Drama		
Heriot-Watt University		
Heythrop College		

Imperial College London		
Keele University		
King's College London		
Kingston University		
Lancaster University		
Leeds Beckett University		
Leeds Trinity University		
Liverpool Hope University		
Liverpool John Moores University		
London Business School		
London Metropolitan University		
London School of Hygiene and Tropical Medicine		
London Southbank University		
Loughborough University		
Manchester Metropolitan University		
Middlesex University		
Newcastle University		
Northumbria University		
Nottingham Trent University		
Oxford Brookes University		
Plymouth University		
Queen Margaret University		
Queen Mary University of London		
Queen's University Belfast		
Regent's University London		
Robert Gordon University		
Royal College of Art		
Royal College of Music, London		
Royal Holloway, University of London		
Royal Veterinary College		
Sheffield Hallam University		
SOAS, University of London		
Southampton Solent University		
St George's, University of London		
Staffordshire University		
Swansea University		
Teesside University		
The Glasgow School of Art		

London School of Economics and Political Science		
The Open University		
The Royal Central School of Speech & Drama		
The University of Buckingham		
The University of Edinburgh		
The University of Hull		
The University of Manchester		
The University of Northampton		
The University of Nottingham		
The University of Sheffield		
The University of West London		
The University of Winchester		
The University of York		
Trinity Laban Conservatoire of Music and Dance		
Ulster University		
University College London		
University of Aberdeen		
University of Bath		
University of Bedfordshire		
University of Birmingham		
University of Bolton		
University of Bradford		
University of Brighton		
University of Bristol		
University of Cambridge		
University of Central Lancashire		
University of Chester		
University of Chichester		
University of Cumbria		
University of Derby		
University of Dundee		
University of East Anglia		
University of East London		
University of Essex		
University of Exeter		
University of Glasgow		
University of Gloucestershire		
University of Greenwich		
University of Hertfordshire		
University of Huddersfield		
University of Kent		
University of Leeds		
University of Leicester		

University of Lincoln		
University of Liverpool		
University of London		
University of Oxford		
University of Portsmouth		
University of Reading		
University of Roehampton		
University of Salford		
University of South Wales		
University of Southampton		
University of St Andrews		
University of Stirling		
University of Strathclyde		
University of Sunderland		
University of Surrey		
University of Sussex		
University of the Arts London		
University of the Highlands and Islands		
University of the West of England, Bristol		
University of the West of Scotland		
University of Wales		
University of Wales Trinity St David		
University of Warwick		
University of Westminster		
University of Wolverhampton		
University of Worcester		
York St John University		
Governmental Research agencies		
Private research organisations		

NATIONAL RESEARCH FUNDING INSTITUTES

Name funding institutes	Acronym
Arts and Humanities Research Council	AHRC
Biotechnology and Biological Sciences Research Council	BBSRC
Engineering and Physical Sciences Research Council	EPSRC
Economic and Social Research Council	ESRC

Medical Research Council	MRC
Natural Environment Research Council	NERC
Science and Technology Facilities Council	STFC
Higher Education Funding Council for England	HEFCE
Higher Education Funding Council for Wales	HEFCW
Scottish Funding Council	SFC
(Northern Ireland) Department for the Economy – Higher Education Division	DfE
140 Members of the Association of Medical Research Charities	AMRC
The British Academy	-
The Royal Academy of Engineering	-
The Royal Society	-
The Leverhulme Trust	-
The Nuffield Foundation	-

NATIONAL OVERARCHING BODY OF SCIENTIFIC INTEGRITY

Name organization	Acronym
There is no national overarching body of scientific integrity in the UK	

OTHER

Name organization	Acronym
United Kingdom Research Integrity Office (charitable/voluntary organization)	UKRIO
Health Research Agency (provides ethical oversight of all NHS research)	HRA
Institutional Research Ethics Committees (based within each HEI)	
Medicines and Healthcare products Regulatory Agency	MHRA
Committee On Publication Ethics	COPE
Research Councils UK (Strategic partnership of the 7 research councils)	RCUK