Research Integrity/Misconduct Policies of Canadian Universities

Jordan Schoenherr
Carleton University

Bryn Williams-Jones
Université de Montréal

ABSTRACT

In a context of increasing attention to issues of scientific integrity in university research, it is important to reflect on the governance mechanisms that universities use to shape the behaviour of students, researchers, and faculty. This paper presents the results of a study of 47 Canadian university research integrity/misconduct (RIM) policies: 41 institutions (87%) had distinct policies dealing with research misconduct, 37 (90%) of which took the form of research integrity/misconduct policies. For each of these 41 documents, we assessed the stated policy objectives and the existence (or not) of procedures for managing allegations of misconduct, definitions of misconduct, and sanctions. Our analysis revealed that, like their American counterparts, most Canadian universities had policies that contained the key elements relevant to protecting research integrity and managing misconduct. Yet, there was significant variability in the structure and content of these policies, particularly with regard to practical guidance for university personnel and review bodies.

RÉSUMÉ

Dans un contexte où les questions d'intégrité scientifique dans la recherche universitaire suscitent de plus en plus d'attention, il est important de réfléchir aux mécanismes de gouvernance que les universités utilisent pour façonner le comportement des étudiants, des chercheurs et des professeurs. Cet article présente les résultats d'une étude sur les politiques d'intégrité de recherche et d'inconduite scientifique (RIM) de 47 universités canadiennes : 41 établissements (87 %) avaient des politiques distinctes traitant de l'inconduite scientifique, dont 37 (soit 90 %) prenaient la forme de politiques de type RIM. Pour chacun de ces 41 documents, nous avons évalué les objectifs de politique énoncés et constaté l'existence (ou l'absence) de procédures de gestion des allégations d'inconduite, de définitions d'inconduites et de sanctions. Notre analyse a révélé que, tout comme leurs homologues américains, la plupart des universités canadiennes possèdent des politiques comprenant les principaux éléments relatifs à la protection de l'intégrité en recherche, ainsi qu'à la gestion de l'inconduite scientifique. Pourtant, il existe une grande variabilité dans la structure et le contenu de ces politiques, en particulier en ce qui a trait aux conseils pratiques pour le personnel universitaire et les organismes d'examen.

INTRODUCTION

While not new, concerns about scientific integrity, academic misconduct, and conflicts of interest have in recent years been receiving increasing public and policy attention in the international research community. In Canada, issues of research integrity and misconduct are beginning to be addressed through discussions in policy forums, education and training programs, and the implementation of policies and committee review. Surprisingly, there is very little empirical information available about the actual policy mechanisms in place that govern the Canadian scientific community (Hickling Arthurs Low (HAL), 2009; Pencharz, 2007). To respond to this lacunae, in 2007–2008 we conducted a quantitative study of research integrity/misconduct (RIM)[1] policies at 47 Canadian universities, analysing a total of 41 distinct policies. As the implementation of similar policies has been addressed elsewhere (HAL, 2009), the policy analysis presented here aims to provide a comprehensive and descriptive assessment of the RIM policy landscape in Canada. To assess these policies, we used a grid of 12 key components – a synthesis of key components recommended by Steneck (1994), CHPS Consulting (2000), Greene, Durch, Horwitz, and Hopper (1985), and Lind (2005) – that we argue should be present in a RIM policy (see Table 3 for a complete list).

There have been a number of studies in the United States documenting the range and scope of research integrity and misconduct policies implemented by academic institutions (CHPS Consulting, 2000; Greene et al., 1985; Lind, 2005) and biomedical research facilities (American Institute for Research, 2003). More well examined, both in the U.S. and internationally, have been policies for the management of various types of conflicts of interest (Krimsky & Rothenberg, 2001; Boyd, Lipton, & Bero, 2004; Lipton, Boyd, & Bero, 2004; Williams-Jones & MacDonald, 2008), and professional codes of ethics or codes of conduct (e.g., Chalk, Frankel & Chafer, 1980; Jorgensen, 1995; Leach & Harbin, 1997; UNESCO, 2002; US Office of Research Integrity, 2000). It is important, however, to distinguish between these other types of policies or guidelines, as well as the committees that use them, and determine whether those policies are dealing with research integrity or research misconduct. Codes of ethics tend to constitute some admixture of inspirational, regulatory, and educational elements (Frankel, 1989); conflict of interest policies are directed toward more general concerns regarding the avoidance of real or potential bias; and policies on research ethics are by and large restricted to ensuring the protection of human (or animal) research participants. For instance, while policies governing research ethics and research ethics boards (REBs) are concerned with some issues related to research misconduct (i.e., if confidentiality is not maintained or research subjects are exposed to unacceptable risk of harm) they may not have the necessary procedures or guidelines for dealing with the more general norms of science (e.g., duplicate publications or data fabrication).

While the issues dealt with by RIM policies may overlap to some extent with these other documents (e.g., codes of ethics, conflict of interest policies, research ethics guidelines), RIM polices differ in important ways with regard to scope, mandate, and punitive powers. Designed to address the full range of activities conducted throughout the research process, we argue that RIM policies should constitute a distinct class of regulatory policy and one worthy of focused and detailed analysis. Our study contributes to such an analysis by presenting the current state of Canadian RIM policies, and also reflecting on some of the strengths and limitations of these documents.

THE UNIVERSITY POLICY LANDSCAPE

Before proceeding to our study of the Canadian university policy environment, it will be helpful to first briefly review the existing academic literature on policies governing research integrity and misconduct. This will set the groundwork for explaining our choice of methodology and provide justification of our selection of key components that should be included in RIM policies.

US Institutional Policies

Institutional policies that address research integrity have not been the subject of much empirical examination. Those studies that have assessed university and other institutional policies have generally sampled large and diverse population sets in the United States (e.g., universities, research centres, hospitals), used a variety of methods, and evaluated different criteria, thus making direct

comparisons between these studies difficult. Nonetheless, three studies are worth particular attention, notably those of Greene et al. (1985), CHPS Consulting (2000), and Lind (2005).

Greene et al. (1985) conducted the first and most extensive review – using an open-ended questionnaire that analysed both formal written and informal unwritten policies – to study 493 policies of academic institutions and hospitals in the U.S. Of the written policies, only 33% explicitly mentioned "research fraud" with another 38% containing such provisions in broader policies. Written policies were broken down into seven procedural phases, variously represented as informal resolutions (27%), discussions (29%), investigations (69%), arbitration/mediations (18%), hearings (44%), appeals (35%), and sanctions (56% explicitly specified, 16% left unspecified). This study also identified eight additional policy considerations: the importance of defining research fraud, the need to distribute policies or guidelines to the university community, the inclusion of participants (e.g., accuser and accused) in procedures, the notification of funders and journals, publicity and transparency of procedures, attention to legal and quasi-legal considerations, the power of deterrence, and the importance of peer review. Among their key findings, Greene et al. noted widespread differences both in the degree and extent to which policies covered issues of research misconduct.

The CHPS Consulting (2000) review, prepared for the U.S. Office of Research Integrity (ORI) at the Department of Health and Human Services, examined institutional policies in a different manner. Their sample population of 156 university, hospital, and research centre policies had already been selected by the ORI as conforming to existing federal regulations concerning research integrity. The study examined more specific issues than those examined by Greene et al (1985). Six topical areas were identified (from an initial list of eighteen): definition of misconduct, allegation procedures, fairness of investigation process, rights of parties involved, inquiry and investigation processes, and other considerations. All of these elements were represented to varying degrees in the institutional policies examined. For instance, inclusion of specific policy elements ranged from unanimous coverage, such as the specification of committee membership and rights of respondents (100%), only slight majority representation such as specification of sanctions (73%), appeal processes (56%), and definitions of misconduct (53%), to a minority of policies (41%) including confidentiality provisions.

Lastly, although Lind's (2005) review examined only 41 U.S. universities, this more recent study nonetheless presented similar findings. The twenty areas that Lind examined were grouped into five categories containing preliminary components (41%; e.g., misconduct definition, mentoring), ensuring fairness (54%), respondent-whistleblower rights (71%), inquiry and investigation (78%), and outcomes (53%). Not all institutional policies contained all possible topic areas, although the majority of elements were touched on by most policies.

While there may be a lack of consensus in the literature with regard to the necessary and sufficient components of institutional RIM policies, it is clear that there are a number of widely agreed upon key elements. Steneck (1994), in his examination of the history of institutional policies (see also Steneck 1999), identified these basic features or elements. Specifically, he lists the considerations for creating an effective RIM policy as including definitions of misconduct, inquiries/allegations assessment, and investigation/adjudication. This list is thus arguably a minimal standard for institutional policies. A more comprehensive analysis should, we suggest, consider both these general elements as well as more precise subcomponents that would enable RIM policies to be operationalized.

Canadian Institutional Policies

Pencharz (2007) conducted the first review of Canadian university RIM policies. His report was a high-level analysis developed to examine whether the standards of Memorial University of Newfoundland (henceforth referred to as Memorial University) were comparable to other universities and whether their policy met national standards, namely those set out in the *Tri-Council Policy Statement: Integrity in Research and Scholarship* (TCPS-IRS, 1994, updated 2005). [2] After reviewing a selection of policies from six Canadian universities, and other scholarly references addressing standards and guidelines, Pencharz concluded that Memorial University's policy was sufficient and was applied satisfactorily in the specific case of Dr. Ranjit Chandra, who had falsified numerous studies over the course of nearly three decades as a professor at the University (Smith, 2005). Though insightful, the Pencharz (2007) study is limited in two respects. First, due to the small sample size, the study cannot be said to

fully address the diversity of concerns regarding RIM policies at Canadian universities. Second, as the Pencharz study was not designed to quantitatively assess specific policy elements, there is no means by which to compare one university to another. A more comprehensive assessment is required.

More recently, a report commissioned by the Canadian Research Integrity Forum (CRIF)[3] examined a broader cross-section of institutions and policies (HAL, 2009) than the study by Pencharz (2007). Thirty-seven policies were examined with the majority (27) selected from universities. The results were based on both qualitative and quantitative methods consisting of policy analysis and interviews with academic administrators, respectively. Despite many similarities with the findings of our study (examined further in the Discussion section) there are several noteworthy differences. First, the HAL (2009) report did not quantify either the extent to which stakeholders (e.g., faculty, external affiliates, students) or components of the allegation procedure (i.e., reporting, initial inquiry, and formal investigation) were included in institutional policies. Second, there was differential representation of types of misconduct observed in the HAL review and our study that is likely attributable to the sample populations. Finally, the number of universities sampled in the HAL review was smaller – 27 in comparison with the initial set of 47 (41 policies analysed) in our study – potentially skewing results and providing an incomplete picture of the university policy environment. Our study thus aims to provide a more comprehensive survey of the Canadian policy landscape than has been achieved in previous studies.

METHOD

In order to select an appropriate sample population for our study of Canadian university research integrity policies, we used a measure that considered both university productivity and research funding received as a means of accounting for the impact of an institution on the scientific record. Arguably, those institutions that have the greatest impact should also have effective policies for ensuring the integrity of their scientific community. After examining potential populations, an initial set of the 50 highest ranked universities was identified using the 2008 annual report published by RE$EARCH Infosource (http://www.researchinfosource.com/). The composite indicator used in that report considers the annual rate of publication and funding received by the institution and faculty members. In order to limit the study size, the sample was restricted to full-service institutions (i.e., those institutions with undergraduate and graduate programs, medical and business schools, etc.), with a result of 47 institutions (Table 1).[4]

Between April 2007 and July 2008, general Internet and individual website searches were conducted to obtain the university policies. If a policy could not be retrieved via an Internet search, the university's research office was contacted by phone or email to request relevant documentation. In order to clarify certain areas of French-language policies, two translation engines were used to verify policy content (Google Translate, Babelfish). Both translation engines returned results conforming to the authors' interpretation of the policy. This method also proved useful for the keyword analysis mentioned below. Where there may be an imperfect translation, French words are presented in parentheses.

To ensure the clarity of our results, only an institution's key or central RIM policy was reviewed; policies of individual units, departments, faculties, colleges, or schools were excluded. Where a single policy document was not immediately available, other related policies were examined to ensure that relevant information was not contained elsewhere. To this end, the documents surveyed included the following terms in their title: *honesty*, *integrity (integrité* and *probité)*, *misconduct (inconduite)*, *fraud*, *research*, *science*, *intellectual*, *scholarly*, *academic*, and *ethics* (see Table 2). When any combination of these terms was contained in the document title, the document was examined. As a result, both central research integrity measures as well as distributed policies can be considered together. Additionally, although some policy elements are potentially related to research integrity and mentioned in separate documents (e.g., collective agreements may contain sanctions and appeal procedures), unless these are specified in the context of research integrity or misconduct, they were not included in our analysis.

The goal of our study was to identify a policy's underlying purpose, the rights of the parties involved, the perceived nature of integrity and misconduct, and the procedures used in the course of dealing with allegations of misconduct. Using the basic elements identified by Steneck (1994) as a

Table 1.
Canadian Institutional Policies (n=47)

Institutions	Policy Title
Acadia University	Research Integrity Policy
University of Alberta	Research and Scholarship Integrity Policy
University of British Columbia	Scholarly Integrity
Brock University	Policy on Integrity in Research Scholarship
Carleton University	NA
University of Calgary	Integrity in Scholarly Activity
Cape Breton University	NA
Concordia University	Guidelines for Ethical Action
Dalhousie University	Policy on Integrity in Scholarly Activity
University of Guelph	Academic and Fraud Misconduct
Lakehead University	Guidelines and Policy for the Ethical Conduct of Research and Procedures for Investigating Misconduct
Laurentian University	Policy on Integrity in Research and Scholarship
Université Laval	Politique relative à l'intégrité scientifique
University of Lethbridge	Integrity in Research and Scholarship
University of Manitoba	Procedures for Investigating and Reporting Academic Fraud
McGill University	Procedures for Investigating Reports of Misconduct in Research
McMaster University	Procedures for Inquiries and Hearings regarding Allegations of Misconduct in Research for Faculty, Staff and Post-Doctoral Fellows
Memorial University	Policy Statement on Integrity in Scholarly Research
Université de Moncton	Politique d'intégrité en recherché
Université de Montréal	Probité intellectuelle en recherché
University of New Brunswick	NA
University of Northern British Columbia	General Research Ethics
University of Ottawa	Guidelines for the Ethical Conduct of Research and Procedures for Investigating Misconduct
University of Prince Edward Island	Policy on Integrity in Research and Scholarly Work
Université de Québec à Abitibi-Témiscamingue	Politique d'intégrité dans la rechereche et les travaux d'érudition
Université de Québec à Chicoutimi	Procedure relative a l'inconduite dans les travaux de recherche ou de creation, Procédure relative au traitement des plaintes concernant l'inconduite
Université de Québec à Montréal	Politique sur les conflits d'intérêts et sur l'intégrité académique
Université de Québec à Rimouski	Politique institutionnelle en matière d'intégrité scientifique
Université de Québec à Trois-Rivère	Politique d'éthique en recherche
Queen's University	NA
University of Regina	Procedure for Reporting and Investigating Scholarly Misconduct, Misconduct Policy
Royal Military College of Canada	Misconduct in Research
Ryerson University	NA
St. Francis Xavier	NA

St. Mary's University	Policy Statement on Integrity in Research and Scholarship and Procedures for Reporting and Investigating Scholarly Misconduct
University of Saskatchewan	Policy Dealing with Misconduct in Scholarly Work
Université Sherbrooke	Politique, règles et procédures sur l'intégrité en recherche et sur les conflits d'intérêts
Simon Fraser University	Integrity in Research and Misconduct in Research
University of Toronto	Framework to Address Allegations of Research Misconduct
Trent University	Policy on Scholarly Misconduct
University of Victoria	Policy on Scholarly Integrity
University of Waterloo	Integrity in Research, Administrative Guidelines
University of Western Ontario	Policy and Procedures for the Conduct of Research
Windsor University	Ethical Conduct of Research
Wilfrid Laurier University	Fraud and Misconduct in Academic Research and Scholarly Activity
University of Winnipeg	Policy and Procedures on Integrity in Research and Scholarship
York University	Misconduct in Academic Research

starting point – that is, misconduct definitions, inquiries/allegations assessment, and investigation/adjudication – we included additional policy elements or components identified in the three studies mentioned above (i.e., Greene et al., 1985; CHPS, 2000; Lind, 2005). This produced a total of 12 components (and numerous sub-components) for our analysis: (1) Existence of a RIM Policy, (2) Objectives of Document, (3) Applicability Statement, (4) Responsible Scientific Practices, (5) Roles and Responsibilities, (6) Definition of Misconduct, (7) Allegation Submission Procedure, (8) Rights of the Parties, (9) Inquiry, (10) Investigation, (11) Follow-Up Procedures, and (12) Other (see Table 3).

The coding of the data was conservative: when an item was clearly evident or could be reasonably inferred it was counted as present and given a score of one; if there was a possibility that an item was present but was not clearly evident it was given a null score. For example, if a document mentions that an inquiry results in a report, or that a committee's conclusions are to be communicated to an appropriate official, it was counted as a report. If instead it was stated that an investigator recommended further investigation but did not mention a summary of available evidence, it was not counted, as the implications of such statements are not clear.

For the purpose of clarity, some terminological notes are required. Unless otherwise specified, *Dean* refers to the dean of the faculty of the respondent; *President* refers to the president of the university; *Vice-Presidents* are specified as they include those designated for *Research*, *Graduate Studies*, *Academic*, and *International*; and *University* refers to the academic institution under consideration. The term *granting councils* refers to the three Federal or Tri-Council funding agencies (SSHRC, CIHR, and NSERC). This latter term can be distinguished from *funders* who represent any party external to the university that provides funds for research (including, for example, charitable organizations, provincial governments or agencies). Lastly, a *third party* typically refers to a representative of the collective bargaining unit. However, some policies leave this open to interpretation and it potentially includes a senior member of the faculty, or a legal representative.

RESULTS

From an initial set of 47 Canadian universities, we identified 41 unique policy documents, 37 (90.2%) of which were in the form of distinct RIM policies (it should be noted that since the time of this survey, several institutions have adopted or modified their policies). This preference suggests recognition of the need for a self-contained set of procedures to address the specific issues of research integrity and misconduct. In contrast, only three (7.3%) documents were located in collective agreements and one (2.4%) in the form of a research ethics document. This latter document could also be considered a distinct RIM policy that simply adopted different terminology. This difference in

observed titles prompted an analysis of keywords used to describe research misconduct policies. A cursory examination of title keywords was performed as a means of checking that appropriate documents had been obtained. The keywords also demonstrate how universities conceptualize the issue of research integrity and misconduct. Table 2 shows the percentage of policy documents with a given keyword with frequencies in parenthesis.

Table 2.
Keyword Analysis

Keyword	Percentage (Frequency)
Research	65.8% (25)
Integrity (Probité/Intégrité)	54.1% (20)
Scholarship	39.5% (15)
Misconduct (Inconduite)	32.4% (12)
Ethical	13.5% (5)
Academic	10.5% (4)
Conduct	5.4% (2)
Scientific	5.4% (2)
Fraud	2.7% (1)

The analysis of keyword usage in policy titles indicates that the majority of documents pertain to "research" (65.8%) and "integrity" (54.1%), while slightly fewer are concerned with "scholarship" (39.5%) and "misconduct" (32.4%). Interestingly, far fewer documents used the keywords "ethics" (13.5%) and "academic" (10.5%) in their titles. The most infrequent terms included "conduct" (5.4%), "scientific" (5.4%), and "fraud" (2.7%). On average, 2.4 keywords were used in a document title, with a range of 1 to 5 keywords.

In our study, the main components or elements of interest for a university policy were grouped topically for analysis, and then further broken down into subcomponents. Where a primary component was absent, subcomponents were excluded so as not to bias scoring through double counting. Table 3 presents a summary of these findings and is followed by a discussion of the results for each main component included in university policies.

1) Prevalence of Research Misconduct Policies

The primary purpose of this study was to identify the prevalence of research misconduct policies and their constituents. Of the 47 institutions surveyed, 41 (87.2%) had unique RIM policies that met or exceeded the TCPS-IRS (1994/2005) standards, and were applicable to the university as a whole and not simply confined to specific faculties or units. This high prevalence of distinct policies indicates the clear importance that institutions are giving – at least in principle – to preventing or managing research misconduct.

2) Document Stated Objectives

Those policies that stated their objectives (92.7%) showed great disparities in terms of whether they aligned themselves with the Tri-Council policy explicitly (50%; e.g., "This policy should be read in conjunction with the Tri-Council Policy Statement on Integrity in Research and Scholarship..."), whether they mentioned funders generally (31.6%), or whether they cited the law as an impetus for the current document (28.9%). These items appeared in many different combinations and forms. Given the changing policy context regarding research integrity, research ethics, and academic integrity in Canada – e.g., there is significant public and policy discourse about conflicts of interest (particularly in government) – it may be that stated policy objectives will change over the next few years.

Table 3.
Inclusion of Main Components in Canadian University Policies

Policy Components	No. of Policies	% of Policies
(1) Research Integrity/Misconduct Policy	41/47	87.2
(2) Objectives of Document	38/41	92.7
(i) Tri-Council or Individual Agency	19/38	50.0
(ii) Other Funders	12/38	31.6
(iii) Legal Requirements	11/38	28.9
(3) Applicability Statement	41/41	100.0
(i) Staff/Faculty	41/41	100.0
(ii) Student	29/41	70.7
(iii) External Affiliates	30/41	73.2
(4) Responsible Scientific Practices	32/41	78.0
(i) Data Management	25/32	78.1
(ii) Conflict of Interest	15/32	46.9
(iii) Authorship Guidelines	17/32	53.1
(5) Roles and Responsibilities	28/41	68.3
(i) Researchers	26/28	92.9
(ii) Institution	19/28	67.9
(iii) Academic Administration	21/28	75.0
(6) Definition of Misconduct	38/41	92.7
(i) Fabrication and Falsification	38/38	100.0
(ii) Plagiarism	38/38	100.0
(iii) Conflicts of Interest	29/38	76.3
(iv) Misuse of Funds	25/38	65.8
(v) Authorship Inclusion/Exclusion	22/38	57.9
(vi) Violations of Research Ethics	22/38	57.9
(vii) Failure to Follow Fed. Regulations	22/38	57.9
(viii) Other Misconduct	33/38	86.8
(7) Allegation Submission Procedure	38/41	92.7
(i) Require Written Submission	32/38	84.2
(ii) Require Signature	18/38	47.4
(iii) Identification of the Complainant	16/38	42.1
(iv) Allowance for Anon. Complaints	6/38	15.8
(v) Identification of the Respondent	13/38	34.2
(vi) Inclusion of All Relevant Details	20/38	52.6
(8) Rights of the Parties	37/41	90.2
(i) Confidentiality of Parties	34/37	91.9
(ii) Rights of Complainants	26/37	70.3
(iii) Rights of Respondents	30/37	81.1
(9a) Preliminary Inquiry Committee	34/41	82.9
(i) Initial Inquiry Performed by Dean/VP	28/34	82.4
(ii) Members External to Department	12/34	35.3
(iii) Members Internal to Department	11/34	32.4
(iv) Members External to University	10/34	29.4

(v) Permanent Appointments	29/34	85.3
(vi) Ad-hoc Appointments	13/34	38.2
(9b) Inquiry Process	32/41	78.0
(i) Full Power of Investigation	31/32	96.9
(ii) Report Submission Required	17/32	53.1
(10a) Investigation Committee	38/41	92.7
(i) Dean or Vice-President as Primary Investigator	15/38	39.5
(ii) Members External to Department	26/38	68.4
(iii) Members Internal to Department	21/38	55.3
(iv) Members External to University	17/38	44.7
(v) Permanent Appointments	16/38	42.1
(vi) Ad-hoc Appointments	29/38	76.3
(10b) Investigation Process	38/41	92.7
(i) Full Power of Investigation	35/38	92.1
(ii) Restricted Investigation Powers	1/38	2.6
(iii) Power to Sanction	14/38	36.8
(iv) Written Report	35/38	92.1
(11) Follow-Up Procedures	31/41	75.6
(i) Appeal Mechanism	18/31	58.1
(ii) Contact Research Sponsor	25/31	80.6
(12) Other	38/41	92.7
(i) Timeline for Inquiry Process	35/38	92.1
(ii) Alignment with Collective Agreement	28/38	73.7

For Component 1, the percentage prevalence of institutional Research Integrity/Misconduct Policies is calculated for n=47 (total number of policies); for Components 2 through 12, percentages are based on n=41 (the number of policies examined); for sub-components, percentages are calculated from the nominator of the main Component.

3) Applicability Statement

An applicability statement refers to the portion of the text that indicates the parties who are bound by the document. For instance, one applicability statement might restrict a policy to only researchers (e.g., "These procedures apply to…any person holding an appointment governed by the University Procedures for Appointment, Promotion and Dismissal, and also apply with such variations as are necessary to complaints against persons holding Post-Doctoral Fellowships or their equivalent") whereas another might have a broad application to anyone in the university community, including students (e.g., "This Code is designed…to guide all University members (members of the Board of Governors, administrators, staff, faculty, and students)…"). A policy that is limited in scope will result in fewer cases being identified as it applies to fewer individuals. All 41 documents in our study contained applicability statements, and in all cases they mentioned that the policy governed faculty/researcher conduct. Affiliated members of the university were generally covered under the policy (e.g., post-doctoral fellows, contractors; 73.2%), as were students (70.7%).

4) Responsible Scientific Practices

The majority of policies (78.0%) mention some items that can be counted as a facet of responsible scientific practices (e.g., "rigorous attention to citing the contributions of others…careful planning of research protocols, ensuring that methods of analysis are appropriate and assuring access to the data for a reasonable period of time…proper use of all research resources…"). Items that covered responsible scientific practices included standards for data management (78.1%), conflicts of interest (46.9%), and authorship (53.1%). In these data we see the importance of providing examples

(alongside formal definitions, see Section 6 below) of what are considered responsible and irresponsible practices. Attention, however, needs to be given to the tone and language used to describe these practices (e.g., positive and "inspirational" or negative and "legalistic") as this can have an impact on the "readability" or interpretation of the document in question (Williams-Jones & MacDonald, 2008; Smith & Williams-Jones, 2009).

5) Roles and Responsibilities

Although most policies did not contain any substantive provision for education or training of researchers or students, a substantial number discussed the roles and responsibilities of members of the university community (68.3%). However, in some instances there was explicit mention of the duties of a supervisor to impart information to students (i.e., mentoring). Of those policies that addressed responsibilities of members of the university community, the majority mentioned the obligations of researchers (92.9%); slightly fewer indicated the duties of the academic administration such as deans, vice-presidents, etc. (75%; e.g., "The President shall decide whether the circumstances warrant an investigation…. [This] authority hereunder may be delegated"), while still fewer outlined the general role of the institution in maintaining research integrity (67.9%; e.g., "[The University] acknowledges and accepts responsibility for maintaining high ethical standards in research and scholarship, and agrees to investigate and resolve promptly and fairly all instances of alleged misconduct"). In the latter case, these policies recommended the creation of educational measures, to be conducted either annually or in the form of punctual courses. While important, such a focus on education and the responsibility of researchers may undermine (or at least minimize) the essential role to be played by institutions in promoting environments that encourage research integrity, such as through the implementation of mechanisms that support researcher independence and prevent institutional conflicts of interest.

6) Definitions of Misconduct

Although misconduct can generally be inferred from statements on responsible scientific practices, clearly defining what constitutes unacceptable behaviour arguably provides a standard for both researchers (in a sense, part of a code of ethics), administrators, and those who are required to mediate allegations of misconduct. Moreover, making clear an institution's vision of what counts as misconduct allows this view to be challenged and debated openly by the academic community, thereby increasing transparency.

Nearly all (92.7%) institutions in our study defined misconduct in their policy. Those that did uniformly included in their definitions the fabrication and falsification of data, and plagiarism (100%), and generally also included conflicts of interest (76.3%). Importantly, though, the policies we examined rarely restricted themselves to only these issues. Other issues most commonly included in definitions of misconduct were the misuse of funds (65.8%), unauthorized inclusion or purposeful exclusion of authors from publications (57.9%), violations of research ethics norms (57.9%), and failure to meet government regulations (57.9%). Interestingly, most definitions (86.8%) also included some other form of misconduct, such as abuses of authority, misappropriation of data, gross negligence, and exclusion of honest errors. Honest errors include typographic errors that misrepresent or change the interpretations of a study's findings, errors in figures and tables presenting data, and similar unintentional mistakes. This diversity in how institutions define "misconduct" is arguably linked to the current vagueness in the broader academic community about what constitutes research integrity and good conduct. It may not be necessary for Canadian institutions to agree on a uniform or national definition of misconduct; there is arguably a place for regional and local specificity. Nonetheless, we suggest that a national discussion about what constitutes research misconduct – as well as responsible scientific practices or integrity – across the full range of academic disciplines would be of enormous help to institutional policy makers and the Canadian academic community more generally.

7) Allegation Submission Procedures

Nearly all policies (92.7%) included procedures for reporting misconduct allegations. Including such procedures within a policy document provides complainants a contact point and allows them to

understand what is required of them. Allegations of misconduct are generally submitted in writing (84.2%), and in some instances, it appears that the official that allegations are reported to can assist in drafting a formal complaint. Policies differ in certain features, for example, with 47.4% requiring a signature and 42.1% requiring the identification of the complainant. Only 34.2% of policies specify the identification of the respondent as a requirement; while this may appear odd, it seems likely that the need for full identification is to be inferred when, for example, policies stipulate that all relevant details should be required when reporting the allegation (52.6%). Interestingly, very few institutions accepted anonymous allegations of misconduct (15.8%). This may be reasonable given the seriousness of such allegations (e.g., for professional and institutional reputations) and the need for due process. But given the presence of power relations that may mitigate against substantive accusations (e.g., senior vs. junior colleagues, professor vs. student), it is also necessary to have other complaint mechanisms in place, such as an Ombudsman office.

8) Rights of the Parties Involved

A critical aspect of a RIM policy is having a clearly delineated set of rights for the parties involved. In order to be succinct, these have been categorized as those of the respondent (accused), those of the complainant (accuser), and all parties with regard to the issue of confidentiality. Confidentiality was restricted to preserving the identity of the complainant and respondent from being revealed to the broader university community. Of the 37 policies that mentioned rights, most addressed issues of confidentiality of all parties involved (91.9%), while attention to the rights of complainants (70.3%) and respondents (81.1%) was roughly equivalent. Although, in general, policies stated that both complainants and respondents had the right to sit in on the proceedings of the inquiry or investigation, or to view the evidence if the proceedings were closed, respondents sometimes had the additional right to a third party representative whereas complainants had provisions to allow for protection from reprisal. When available, these latter rights of the respective parties were rarely stated in any great detail.

9) Preliminary Inquiry Process

The preliminary inquiry stage is a vital phase in pursuing allegations of misconduct. An initial assessment determines whether a complainant's claims are substantiated and whether a subsequent investigation is required. The composition of inquiry committees was provided for in 82.9% of university policies. Most of these policies placed direct responsibility for the inquiry process on the Dean, Vice-President, or other comparable university official (82.4%); however, there is often mention that this role can be delegated if necessary. In most cases in which senior university officials are responsible for the process, the Vice-President (Research) handles the case unless there is a conflict of interest, in which case the Vice-President (Academic) is the primary contact point.[5]

Policies often require that additional individuals be involved in the initial inquiry. These individuals are sometimes external to the department (35.3%), drawn from faculty members of the department where the allegation is made (32.4%), or from outside the university (29.4%). These parties were included in various combinations to form committees. The vast majority (85.3%) of policies stated that individuals that investigate misconduct are to be permanent or term appointees to a committee, assigned for a given period of time (often a few years); only 38.2% of policies included provisions for ad hoc appointments to committees. The Dean, Vice-President, etc. make these latter appointments in accordance with guidelines that generally make explicit the need to avoid conflicts of interest. Those policies that outline committee membership criteria allow both the complainant and the respondent to object to committee selection on the grounds that these individuals could be biased. This generally results in a three-person committee being formed.

Most policies outlined the inquiry process (78%), and of these, 96.9% vested full investigatory power in the committee, allowing the examination of all available sources of information, including interviews with relevant parties and examination of original data and materials. Interestingly, only about half (53.1%) of these policies mention the submission of a written report by the inquiry committee. Reports were to be destroyed if allegations were not borne out; in those cases where no report was called for, investigators are required to indicate the need for further investigation to an appropriate official.

10) Investigation Process

As with the inquiry committee, the majority of institutions outlined the membership of the investigation committee (92.7%). Of these, the majority required committee members from outside the department(s) of the respondent and complainant (68.4%), with a significant number of institutions allowing for the involvement of faculty from within the department where the allegation was set forth (55.3%), but less than half allowing the involvement of experts external to the university (44.7%). This acceptance of participation by department members and rejection of external experts (probably to avoid publicity) should raise serious concerns about conflicts of interest and the objectivity of investigations. Although those within a department may be the most familiar with the research under investigation, we must also consider the fact that the academic environment is extremely competitive, and this can on occasion lead to unseemly behaviour between colleagues (even to the point of professional vendettas). As such, we strongly believe that – given their quasi-judicial nature – investigating committees be constituted by members free from real or apparent conflicts of interest.

Often the Dean or Vice-President is involved in these proceedings as the primary investigator or as chair of the committee (39.5%). Consequently, most investigations involved ad hoc groups or persons selected to conduct the investigation (76.3%) with a much smaller number of policies requiring the involvement of permanent or term appointees (42.1%). In a similar fashion to the inquiry process, a three-person committee is generally preferred.

Details on the investigation process were equally well presented in institutional policies (92.7%). In the majority of cases, committees were granted full power of investigation (92.1%), with only a very few having restricted capacities (2.6%). These restrictions generally stated that the committee was required to investigate only the charges set forth by the allegation or the findings of the inquiry stage. Presumably, for the purposes of due diligence, the committee would be able to go beyond these limits but such statements were rarely made explicit.

Committees were also limited in terms of whether they were capable of suggesting sanctions (36.8%). The majority of committees were required to submit a written report upon completion of their investigation (92.1%). When charges were supported, these reports were retained for periods from one to ten years depending on the institution. Sanctions were imposed either by recommendation of the committee, by the Vice-President, or were spelled out in the collective agreement. If the respondent was acquitted, these reports were destroyed in a timely fashion (either immediately or within a year of the investigation).

11) Follow-Up Procedures

Follow-up procedures were also contained within the majority of institutional policies (75.6%). More than half of these policies (58.1%) mentioned some process of appeal, and were described as distinct mechanisms, or in reference to a collective agreement. A complementary provision was also evident, and most policies stipulated that after the conclusion of the investigation, any reputational harm that occurred and was unjustified, would be rectified. This includes whistleblower protection which is explicitly stated in most documents but generally not spelled out. Given the seriousness of even alleged misconduct and the difficulty of redressing tarnished reputations, it is unfortunate that more policies do not pay explicit attention to how to address this issue (besides ensuring confidentiality in the investigation process). Importantly, 80.6% of documents with follow-up procedures (that is, 31 policies) stipulated that research sponsors must be contacted at some stage during assessment process. Few documents specified the need to contact affected parties other than funders about a judgment (e.g., journals, colleagues), nor was there consistency or agreement about at what stage of the process funders were to be notified.

12) Other items

The majority of policies also contained pertinent policy items that were outside the major categories listed above (92.7%). In general, these included specific timelines within which the various stages of the allegation, inquiry and investigation procedures should be completed (92.1%). Inclusion of such standards is important for ensuring due process and timely judgements. Where timelines

cannot be met, policies required notification of the involved parties that included a justification for the delay. A considerable number of policies (73.7%) were aligned with the collective agreement between the institution and its employees, with the policy acting as a complement. In cases where they conflict, the policies state that the collective agreement takes precedence.

DISCUSSION

Our study examined 41 research integrity/misconduct policies at Canadian universities (from an initial set of 47 universities) by breaking policies into their constituent components or elements. Although this analysis is essentially descriptive in nature, several conclusions can still be drawn concerning the foci of policy coverage at Canadian research universities, and their relationship to more general Canadian and U.S. institutional integrity guidelines.

Current Standards used in Canadian University Policies

At the most basic level, the RIM policies at Canadian universities include the essential policy components discussed by Steneck (1994) and outlined in the TCPS-IRS (1994/2005). Misconduct definitions, assessment of inquiries and allegations, and investigation/adjudication procedures are all covered by the vast majority of policies. Beyond this minimal standard, it is also apparent that most policies adopted a fairly inclusive approach to dealing with the subject of research integrity in terms of the criteria used in our analysis. Policies typically laid out step-by-step procedures for dealing with misconduct, and itemized lists of basic considerations regarding research integrity. Such an approach is important both for the purposes of clarity for the parties involved in a dispute, as well as for promoting transparency of the system to the academic community and the general public.

However, as mentioned above, the extent to which these elements were dealt with (e.g., in terms of specifying the details of particular procedures) showed significant variation. Some universities only addressed a portion of the main areas recommended for policy coverage. Areas such as roles and responsibilities of members of the academic community, or responsible scientific practice, were the least covered. Although these subjects still enjoyed a strong representation across all policies, it is surprising that they were not better represented given the terms favoured by the keyword analysis (*research* and *integrity*) and the TCPS-IRS requirements for such measures. Instead, there is a clear focus on detailing procedures for addressing allegations of misconduct, and far less attention on encouraging the promotion of research integrity. Although this may simply be an artefact of the keywords used to identify the documents under consideration, the reasons for the adoption of such terminology remain intriguing and have important implications for the perception of research integrity within the scientific community.

Although it can be stated with certainty that the major procedural issues have been addressed in the majority of the Canadian policies we surveyed, there is clearly no uniform or coherent treatment of all research integrity issues. Supporting this conclusion is the great variability in the inclusion of the (important) policy sub-components. Notably, there was very little coverage in the policies of legal matters, issues of conflict of interest, initial inquiry reports, appeal processes, or the committee's power to sanction and the sanctions available. It is important to note that some of these elements are likely covered more fully by other university polices and guidelines, for example, in conflict of interest policies and collective agreements (Smith & Williams-Jones, 2009; Williams-Jones & MacDonald, 2008). But if this is the case, it would seem critical to clarify and be explicit about the relationship between the central RIM policy, and other related policies and guidelines. Like Steneck (1994), we must consider that the appropriateness of a policy can only be determined by considering the institutional context: each university system must be assessed as a whole to ascertain whether it is the optimal solution. It seems likely, however, that certain configurations of policies and subcomponents may provide a more transparent and effective infrastructure. Whether this is the case or not remains an empirical question.

Finally, as noted above, the present analysis is limited in that it only examines RIM policies but not their implementation. In the absence of an external body that can receive allegations, institutional policies and procedures must function autonomously. Consequently, further studies are need in order to assess the efficacy and fairness of these policies. In terms of policy efficacy, both the rate of miscon-

duct and the estimated effectiveness of the policy infrastructure at detecting occurrences within an institution need to be considered. Of equal importance is the extent to which a policy treats equally the rights of respondent and complainant regardless of their position within the academic community. Moreover, follow-up procedures must include provisions that ensure that affected parties (e.g., journals and funders) are contacted. Although the prevalence of these components in the present study was moderately high, there is no assurance that the scientific record would be corrected in all cases.

Comparability to other Studies

In addition to areas of policy coverage, conclusions can be drawn from a comparison with the other studies mentioned at the beginning of this paper. Although not contemporaneous, and conducted with a different methodology, the findings of the present study can be contrasted positively with the findings of Greene et al. (1985), CHPS (2000), and Lind (2005). Specifically, in almost every area of policy coverage, the Canadian policies we reviewed are in a better state than was the case in the U.S. in the mid-1980s. This is not surprising given that it was during the 1970s and 1980s that research misconduct became a prominent concern in the U.S. and Canada (Steneck, 1994, 1999). So while the Canadian research community may only be beginning to regard research misconduct as a serious problem, it has a well developed policy infrastructure in place to address these issues, something that has undoubtedly been influenced by developments in the U.S. It should be noted, however, that our study of Canadian university policies was limited to leading research universities, whereas the Greene et al. (1985) study examined the broader U.S. research community and included research centres and hospitals. Perhaps more importantly, we have shown in our study that the key areas covered by Canadian academic institutions are comparable to those within the current U.S. institutional system, as demonstrated by the CHPS (2000) and Lind (2005) studies. These include policy objectives, applicability statements, discussion of responsible scientific practices, definitions of misconduct, rights of the respondent and complainant, allegation procedures, and outline of the inquiry and investigation processes.

The relationship between the present study and the HAL report (2009) is also of importance given the similarity in populations sampled and the period of time in which the studies were conducted. First, while the HAL report noted that the policies typically covered the research and scholarly activities of all stakeholders at an institution, it did not provide relevant statistics. Our study found that all RIM policies included faculty members within their scope, but only about three quarters explicitly included students or external affiliates (70.7% and 73.2%, respectively); that more than a quarter of university stakeholders are not unambiguously included in the remit of these policies has important implications for addressing cases of misconduct. Moreover, as the actions of university administrators can have impacts on research activities, it seems reasonable to consider including administrators explicitly within policy applicability statements.

A second important difference between the HAL report and the present study is evidenced in terms of the types of misconduct identified. Although both studies observed similar coverage in terms of fabrication, falsification, plagiarism, and conflicts of interest, the HAL report observed greater inclusion of authorship concerns whereas we observed greater inclusion of funding issues and research ethics norms.[6] Our study also observed a greater inclusion of other forms of misconduct than did the HAL report, but this finding may be attributable to the smaller number of forms of misconduct considered in our study. For instance, improper data management and retaliation were examined in the HAL report whereas our study did not assess these forms of misconduct explicitly.

Finally, both the HAL report and our study found that most RIM policies were distinct from other policies, with only a small number of such policies being integrated into collective agreements and research ethics documents. The two studies thus show many similarities in the components of research misconduct policies. However, perhaps more informative are the differences that appear to be characteristics of the sample populations used in each review: the fact that types of misconduct differ and that policies do not necessarily include all relevant stakeholders represent important differences that merit further investigation. More specifically, we should consider the factors that might produce these differences (e.g., institution, amount of funding received, average of faculty publications).

Considerations and Future Directions

A final point concerns the nature of the institutional-based mechanisms for promoting research integrity and managing research misconduct in Canada. At present, Canadian universities have no alternative but to investigate cases themselves. This is a time consuming and expensive process. Moreover, there is an inherent and potentially problematic conflict of interest associated with an institution (through delegated committees) conducting an investigation into its own employees' activities while also remaining an impartial arbiter of employee conduct, something that could affect the institution's credibility (e.g., Redman & Caplan, 2005; Steneck, 1994). Conversely, conducting an investigation at an institution where allegations arise brings with it the benefit of familiarity with the parties involved. Clearly, these two concerns need to be balanced.

The findings presented in this paper demonstrate that the research integrity/misconduct policies of Canadian academic institutions are similar in scope and content to those implemented in the U.S. (CHPS Consulting, 2000; Lind, 2005). However, unlike the U.S. with its Office of Research Integrity, there is no centralized body in Canada that can assist with the proceedings of an investigation and provide arms-length support. Existing Canadian university policies, in combination with the TCPS-IRS, may well suffice for dealing with research misconduct. Some authors, however, have suggested that serious consideration be given to how (or whether) systemic changes can be made to improve the governance of research in Canadian universities (Kondro, 2007; Pencharz, 2007). Our study focused on only one aspect of the mechanisms used to address issues of research integrity and misconduct, that is, the nature and content of misconduct policies. Future work should be aimed at providing a deeper ethical analysis of research integrity/misconduct policies and their implementation, in order to evaluate the effectiveness of these measures in both preventing misconduct and in promoting research integrity.

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CONTACT INFORMATION

Jordan Schoenherr
Department of Psychology
Carleton University
1125 Colonel By Drive
Ottawa, Ontario, Canada
K1S 5B6
jschoenh@connect.carleton.ca

Jordan Richard Schoenherr is a PhD Candidate in the Department of Psychology at Carleton University. He has worked as a consultant and principal researcher at Health Canada, developing scientific integrity standards. His research interests include cognition, research integrity, and evolutionary approaches to the development of epistemic frameworks. His current research projects include exami-

ning the dissociation of multiple learning systems in human populations, the identification of biases in decision-making, and applying quantitative methods to the study of scientific norms.

Bryn Williams-Jones, PhD, is an Associate Professor and Director of the Bioethics Programmes, Department of Social and Preventive Medicine, School of Public Health, at the University of Montreal. He is an interdisciplinary scholar who employs analytic tools from applied ethics, health policy, and the social sciences to explore the socio-ethical implications of health innovations. His current research focuses on professional ethics, research integrity, and the management of conflicts of interest that arise in the context of university research and in particular university-industry relations.

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NOTES

1. As shown in Table 1, there is enormous diversity in the naming of institutional policies. Nonetheless, as most of the policy titles include the keywords "research", "integrity", and "misconduct" (see Table 2), for the sake of brevity we have chosen to refer to these policies as "research integrity/misconduct policies" or RIM policies.
2. As a condition of receiving funding from the three main federal granting councils in Canada (the Social Science and Humanities Research Council, SSHRC; the Canadian Institute of Health Research, CIHR; and the Natural Science and Engineering Research Council, NSERC) – collectively referred to as the Tri-Council – university researchers must comply with general principles of responsible scientific practices. These principles include appropriate acknowledgement of the contributions of others (including authorship), revealing potential conflicts of interest, and maintaining rigour throughout the research and reporting process. Institutional responsibilities included in the TCPS-IRS require the promotion of research integrity, the investigation of allegations of misconduct, and reporting on the investigation outcomes to the appropriate council.
3. Established in 2006, the CRIF, formerly the Canadian Research Integrity Committee, is a non-partisan group with seventeen members representing governmental and non-governmental organizations from across Canada; notably, it includes members from the three federal granting councils (SSHRC, NSERC, CIHR) and 2 national university associations (AUCC, CAUT). (CAUT, 2009)
4. During the first phase of our study, this sample constituted 46 universities. However, during the write-up of these results an additional report was published on the top 50 universities including one additional university that was added to the sample population. Not all institutions were classified as "full-service" thus reducing the sample population from 50 to 47.
5. Alternatively, many institutions place primary responsibility with the Dean, with a VP (Research or Academic) as the reserve contact. The title of the individual identified necessarily depends on the structure of the institution.
6. Our category of research ethics subsumes confidentiality, which was explicitly assessed in the HAL report (2009).