

Recommendations:

Recommendation 1: Invest in Canadian laboratories

- Invest more money in a larger number of Canadian laboratories

Recommendation 2: Invest in Canadian graduate students

- Correct the current limitations of the CGS-M scholarship program by raising the CGS-M scholarship level from \$17,500/year for one year to \$22,000/year for two years
- Adjust the values of all doctoral scholarships (PGS-D/CGS-D) to \$35,000/year
- Re-establish the tradition of allowing students to apply for postdoctoral funding twice rather than once
- Eliminate the number of previous tri-council awards as a criterion for determining university allocations of CGS-M awards

Recommendation 3: Acknowledge and negotiate the pragmatic constraints that will be faced by researchers when implementing the Tri-Agency Research Data Management Policy

- Acknowledge and accommodate the complexities associated with making participants' private data open
- Acknowledge and accommodate the complexities associated with making data open prior to scientific publication

Recommendation 4: We recommend that NSERC provide public data about how awards across career levels (undergraduate, graduate, postdoctoral, & faculty) are distributed over gender



Canadian Society for Brain, Behaviour and
Cognitive Science

Société Canadienne des Sciences du Cerveau,
du Comportement et de la Cognition

Dear Standing Committee on Finance,

I am writing in my capacity as President of the Canadian Society for Brain, Behaviour, and Cognitive Science (CSBBCS). The CSBBCS represents hundreds of faculty and student scientists from across Canada who conduct basic and applied research on brain, behaviour, and cognition. Work conducted by our members includes brain mapping, delineating the scope and precision of human cognitive abilities, and the development of cognitive technologies and machine learning algorithms. Members of the society are funded by the Tri-Council agencies. Therefore, our recommendations are focused on helping the committee understand the relationship between Tri-Council funding and Canada's scientific competitiveness on the international scene.

Firstly, on behalf of the CSBBCS, I want to express sincere gratitude for the government's recent and positive commitment to Canadian science and its infusion of funds to Canadian laboratories. Those funds are crucial for Canadian laboratories to lead, to let Canadian scientists set their sights on big problems, to foster invention and innovation, and to support Canada's young scientists who will shape the country's scientific and technological landscape.

Although we are enthusiastic about the past year, we want to offer some advice and recommendations that will enhance Canada's competitiveness in science and innovation.

Recommendation 1:

Invest in Canadian laboratories

- *Invest more money in a larger number of Canadian laboratories*

At the recent annual meeting of the CSBBCS, Eniko Megyeri-Lawless reported that funding rates have increased and that more Canadian research laboratories have been funded this year than in the recent past. We applaud these changes and encourage the continuation of those recent trends. We realize there is a ceiling on the re-investment. However, even a small additional investment in Canadian science promotes a greater diversity of investigation and consequently innovation from Canadian laboratories.

Recommendation 2:

Invest in Canadian graduate students

- *Align the term of the CGS-M scholarship program with the duration of Master's programs and current costs of living by raising the CGS-M scholarship level from \$17,500/year for one year to \$22,000/year for two years*

The CGS-M scholarships fund Master's students at a rate of \$17,500/year for one year. There are two obvious problems with this policy. Firstly, the rate of CGS-M funding has not changed for 15 years and, therefore, has not kept up with changes in the cost of living. Secondly, CGS-M funding is granted for a duration of one year whereas the duration of a Master's degree in all Canadian Universities is two years. The consequence is that Canada's best Master's students who win Canada's most prestigious Master's level award are only funded for half of their degree and they are funded at the same rate they would have been 15 years ago. We recommend that CGS-M funding be increased from \$17,500 to \$22,000 to match increases in cost of living since 2003 and that CGS-M funding be awarded for two years rather than one (i.e., to fund graduate students over the actual duration of their degree).

- *Adjust the values of all doctoral scholarships (PGS-D/CGS-D) to \$35,000/year*

Doctoral scholarships are awarded at two rates: PGS-D awards provide \$21,000/year and CGS-D provide \$35,000/year. There are two problems with the current model. Firstly, it sets up a caste system in a market where the value of a student's research is yet to be determined. Secondly, funding of \$21,000 was given 15 years ago and does not reflect changes in cost of living. We recommend standardizing the value of all doctoral awards at \$35,000/year for all students. Doing so would reflect a realistic adjustment of award values in relation to inflation and address the inequities that the current system imposes on doctoral students in Canada.

- *Re-establish the old tradition of allowing students to apply for postdoctoral funding twice rather than once*

NSERC changed its policy from allowing PhD students to apply twice to its postdoctoral funding program to allowing PhD students to apply only once. The rationale was that the agency had insufficient resources to adjudicate repeated postdoctoral applications. The policy has been controversial for several reasons. Firstly, it forces students to take a high-risk gamble: it is generally true that if a PhD graduate does not secure a postdoc they won't secure a tenure track position. Secondly, it is feasible that an applicant might fail to win a postdoctoral award on the first attempt but win one on the second: this is true for many of our older members who graduated under the two-shot rule. Thirdly, the one-shot rule encourages students to remain in their PhD programs longer than they otherwise might, until they feel competitive for postdoctoral awards: a situation that taxes graduate programs and delays students' careers and personal lives. We recommend that the one-shot decision be repealed so that PhD students are

once again permitted to apply two times for postdoctoral funding. It makes very little sense to invest in funding PhD students up to the moment that they graduate only to limit their development and opportunities after they graduate.

- *Eliminate the number of previous tri-council awards as a criterion for determining university allocations of CGS-M awards*

Currently, universities' allocations of CGS-M awards are determined in part by the number of tri-council awards received by the institution. As a result, universities who were initially allocated a small number of awards following harmonization are systematically disadvantaged because future allocations are limited by past allocations. We recommend eliminating the number of previous tri-council awards received in determining universities' allocations of CGS-M awards.

Recommendation 3:

Acknowledge and accommodate the pragmatic constraints that will be faced by researchers when implementing the Tri-Agency Research Data Management Policy

- *Acknowledge and accommodate the complexities associated with making participants' private data open*

CSBBCS members endorse the Tri-Council's Statement of Principles on Digital Data Management. However, CSBBCS members have expressed a number of concerns over the implementation of that vision. Primarily, our membership has expressed serious concern over their ability to conduct their research if they must release the data they collect. For example, one member of our society asks people to remember personal moments and could not in good faith publish those memories in an online repository; he certainly could not do so without compromising his participants' willingness to confide their stories. Another researcher studies students' intellectual development over the school years and worries that, even after removing any personally identifying markers, a savvy text mining program might manage to identify which scholastic record belongs to which child. Many researchers are concerned about publishing details of their participants' personal health data (e.g., exercise habits, medical histories, fMRI scans, mental illness, learning disabilities). If such data is made open, participants may not want to disclose such personal information and it may be much more difficult to obtain ethics approval from local Research Ethics Boards.

In short, there is a dizzying diversity in the kinds of data that researchers collect to understand how people learn, think, remember, and know. Although much of the data collected could be, and we agree should be, maintained and made available to the public, there are special cases that challenge that good will. We recommend that the policy implementation of the Statement of Principles on Digital Data Management take the privacy of research participants seriously by allowing researchers to keep data private where ethical boundaries would otherwise be crossed. We also recommend that scientists be allowed to promise to their participants that

they will keep the data they provide private if they wish. If researchers cannot ensure privacy, the ability to recruit participants in some settings would be difficult (e.g., students' intellectual development in elementary schools, participation in fMRI research). In other cases, a failure to promise privacy might compromise the precision of data (e.g., participants withholding or editing their personal memories for fear of having them published online).

- *Acknowledge and accommodate the complexities associated with making data open prior to scientific publication*

Once again, members of CSBBCS are enthusiastic about the vision that the Principles on Digital Data Management represent. However, they are concerned with making their data available online prior to publication. In the most obvious case, they want the freedom to keep the data they collect private (i.e., off servers) until those data are published; otherwise, other researchers will have access to their research before they have the opportunity to interpret those data. But, there are even more complicated cases. For example, developmental researchers who study behaviour change over a duration of years would like to keep those data private until the completion of the project. Although the data would eventually be published in full, publishing those data in an ongoing manner would jeopardize their ability to complete the work. Finally, some participants' data are omitted from the data set prior to final analyses for such reasons as their choosing not to complete all components of a task, or for failing to follow instructions. It does not serve much purpose to make the data of such participants publically available when they will not be part of the final published results.

In summary, the statement of principles on open science and data is welcome. But, science is a method and not a topic. Consequently, there is no way to develop a single unyielding policy that can be applied to all cases equally. In crafting the national policy, it will be crucial to acknowledge the differences in the kinds of questions and data that Canadian scientists produce and allow for conditional rules on data sharing and publication. A good step towards achieving this goal is to roll the implementation out slowly enough that researchers can provide feedback and pitfalls can be identified before a policy is set down in stone and difficult to amend relative to the complications and realities that become apparent.

Recommendation 4:

We recommend that NSERC provide public data about how awards across career levels (undergraduate, graduate, postdoctoral, & faculty) are distributed over gender

In 2015, NSERC kindly provided seed funds for the creation of a new society of relevance to our membership – Women in Cognitive Science Canada (WiCS-C). At the 2016 annual meeting of our society, this group presented data obtained from the public NSERC awards database suggesting that women cognitive scientists in Canada are especially vulnerable at the transition from student to postdoc/faculty and beyond (see Titone, Tiv, & Pexman, 2018). We request that NSERC and the other Tri-Council Agencies provide easily accessible public data about

awards distributions as a function of gender so that this situation may be better monitored and addressed in the coming years.

Thank you for your time and attention. Please do not hesitate to contact me if you would like any additional information.

Sincerely,

A handwritten signature in black ink that reads "W E Hockley". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

William E. Hockley
President

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