

KEY MESSAGES

Despite being a national priority for Canada, progress integrating women into science, technology, engineering and mathematics (STEM) careers has stalled. A likely contributor to this situation is the absence of new ideas for policies to promote women's integration into STEM careers. This report synthesizes a broad range of scholarship concerning the likely role of peers in the school-to-work transition for women in STEM. It presents evidence-based opportunities for leveraging peers to promote women's successful transition to and persistence in STEM careers. The opportunities include interventions by both universities and employers. Because most of these opportunities are novel ideas for promoting women's integration into STEM careers, there is little experiential evidence on their effectiveness. For this reason, this report also presents: (1) reactions to these proposals from the practitioners who would be responsible for implementing these proposals, and (2) research designs capable of evaluating their efficacy.

Sample university-based opportunities for leveraging peers to promote women's persistence in STEM careers across the school-to-work transition include several proposals to help ensure women persist in their STEM majors to completion, and several proposals to increase women's likelihood of electing to attempt the school-to-work transition into STEM careers by applying to STEM job opportunities.

Persistence proposals:

- Engineering instrumental interactions with STEM peers via project teams and study groups.
- Replacing the chilly climate with a respectful one with less head-to-head competitions.

Promoting applications to STEM jobs:

- Leveraging social contagion to expand the range of jobs to which students consider applying.
- Targeted collaborations between university career services offices and employers, recruiters, and cooperative partners.

Sample employer-based opportunities for leveraging peers to promote women's persistence in STEM careers across the school-to-work transition include several proposals dealing with recruiting and hiring, and several proposals dealing with promoting job success.

Recruiting and hiring proposals:

- Constructing an effective recruiting team: Use near-peers and a recruiting team that reflects the diversity goals of the hiring firm.
- Never hire singletons. When hiring from universities, always hire more than one person from a given university.
- Promoting referral recruitment

Job success proposals

- Facilitate the social integration of new hires via near-peer social mentoring.
- Promote an inclusive and respectful workplace culture.

Each of these novel proposals requires engagement with peers and are based on existing relevant empirical scholarship on career choices, STEM persistence, career success, labor market processes, and gendered social dynamics. These findings and the scholarship from which they come are detailed in the body of this report as are research designs for the estimation of these proposals' efficacy and effects, and a plan for disseminating these findings and results.

EXECUTIVE SUMMARY

Despite being a national priority for Canada, progress integrating women into science, technology, engineering, and mathematics (STEM) careers has stalled. The House of Commons' Standing Committee on the Status of Women recently published their 2015 report, *Women in Skilled Trades and Science, Technology, Engineering and Mathematics Occupations*. The report acknowledges the enduring problem of gender segregation within STEM careers in Canada. The percentages of women graduating in STEM majors and pursuing STEM careers, although greater now than in 1981 or 1991, has been essentially flat for the last 15 years.

A likely contributor to this situation is the absence of new ideas regarding policies and opportunities to promote women's integration into STEM careers. After presenting evidence for why addressing this problem is an important priority for Canada, the report lists a set of recommendations towards improving the gender integration of Canadian STEM careers. The recommendations from this 2015 report - focusing on mentorship, early outreach, raising awareness, and continued study - bear striking similarities with the recommendations found in the 1981 Science Council of Canada report *Who Turns the Wheel?* Although these recommendations are worthy goals to pursue, their exclusive pursuit over the greater part of the last half century has not produced the desired outcomes. While some may be quick to conclude that the currently-observed percentages are the plateau for women's participation, this report contends that a broader range of potential strategies have yet to be considered and implemented towards increasing women's persistence in STEM over the school-to-work transition. The alternative strategies that are the focus of this report are the role of peers during this transition.

Only one of the 2015 report's 9 recommendations mentions the word "peer." Even so, this recommendation (number 6) does not include any specific guidance for the role that peers may play in the gender segregation of STEM careers, or how peer effects could be leveraged to reduce this segregation. Both North American society and its scholarship tend towards individualism and reductionism, resulting in under-socialized policies and perspectives. The generally under-appreciated role of peers in social and societal outcomes does not negate their import. This report presents a range of explicitly socialized proposals for how schools and employers can achieve additional gains in the gender integration of STEM careers at the school-to-work transition through the use of peers.

Students engage in far more frequent and consequential interactions with their peers than role models precisely at the time when they are contemplating and planning their futures. Students' peers are resources for identity work and mimicry. A range of social processes involving peers have substantial potential as policy levers to promote women's persistence in STEM careers. The proposals in this report to engage with peers towards these goals include interventions both by universities and by employers. Because most of these proposals represent new ideas on promoting women's integration into STEM careers, there is little experiential evidence on their effectiveness. For this reason, this report also presents: (1) reactions to these proposals from the practitioners who would be responsible for implementing these proposals, and (2) research designs capable of evaluating their efficacy.

University-based opportunities for leveraging peers to promote women's persistence in STEM careers across the school-to-work transition include proposals to help ensure women persist in

their STEM majors to completion, and proposals to increase women's likelihoods of electing to attempt the school-to-work transition into STEM careers by applying to STEM job opportunities.

Persistence proposals:

- Engineering instrumental interactions with STEM peers via project teams, study groups, and potentially even STEM-themed co-educational dormitories and living groups. Research findings strongly support the importance of instrumental - that is, task-relevant - relationships for success in a domain. In male-dominated contexts, it is easier for men than for women to cultivate these types of relationships. Policies that encourage these relationships for all STEM students are likely to improve women's persistence.
- Replacing the chilly climate with a respectful one with less head-to-head competitions. Culture is communicated through everyday interactions with peers. Gender-neutral civility and respect-enhancing cultural interventions such as CREW (detailed below) are likely to yield benefits of reducing alienating expressions of gender biases that are currently common experiences among STEM majors. In addition, the head-to-head competition common to STEM major activities and culture is a likely contributor to women's lower STEM persistence. Restructuring competitions towards more collective-goal-oriented activities is likely to have gender-integrating benefits.

Promoting applications to STEM jobs:

- Leveraging social contagion to expand the range of jobs to which students consider applying. Students look to peers for guidance about their career choices. Cultivating job-search groups, akin to study groups, is likely to result in more STEM job applications from women for a wider variety of jobs.
- Targeted collaborations between university career services offices and employers, recruiters, and cooperative partners. Internship, cooperatives, and recent graduates are peers or near-peers who are likely to hold more influence over students' decisions than less similar others. Bringing these near-peers – particularly women, when available – to STEM students will enhance students' sense of efficacy in attaining similar positions.

Employer-based opportunities for leveraging peers to promote women's persistence in STEM careers across the school-to-work transition include proposals dealing with recruiting and hiring, and proposals dealing with promoting job success.

Recruiting and hiring proposals:

- Constructing an effective recruiting team: Use near-peers and a recruiting team that reflects the diversity goals of the hiring firm. The tendency to prefer similar others has implications for which students approach a recruiting table or team and for which potential job applicants are encouraged and positively evaluated by recruiters. Ensuring the recruiting team visiting a university includes both women and recent graduates from that university will lower barriers and promote gender-integration.
- Never hire singletons. When hiring from universities, always hire more than one person from a given university. A wide range of scholarship supports this recommendation for a variety of reasons and with the expectation of yielding multiple benefits. Performance, social integration, and persistence are all expected to increase when hiring pairs (or more) of people versus hiring singletons. Also, people hired in groups are likely to be more

diverse than the equivalent number of people each hired individually. Although these benefits are likely to help everyone, they are likely to disproportionately benefit women in STEM.

- Promoting referral recruitment. Referral recruitment has long been viewed as exclusively contributing to the preservation or exacerbation of job segregation in a manner that is beyond the realm of organizational influence. Recent research counters these views and has shown how firms can use referral recruitment to promote integration by getting under-represented group members to refer more.

Job success proposals

- Facilitate the social integration of new hires via near-peer social mentoring. Whereas mentors and sponsors are important and useful for navigating the professional structure and career ladder within an organization and profession, a new hire's social integration into a firm is also critical for instilling a sense of belonging, fit, and the potential for a future there. A formalized process of social mentors using near-peer recent hires made available to all new hires can compensate for an existing informal process that otherwise disproportionately advantage men in male-dominated STEM workplaces.
- Promote an inclusive and respectful workplace culture. This proposal mirrors in the workplace the goal of replacing the chilly climate present among STEM majors with a more inclusive and respectful culture. The CREW intervention (described in detail below) was designed for workplaces, and is a good candidate for a gender-neutral culture intervention that is likely to yield gender-integrating benefits.

Whenever possible, these proposals are suggested as gender-neutral policies. In many cases, these proposals represent a formalization of processes already taking place informally, but in a gender-unequal manner. For example, absent a formalized social-integration program within a male-dominated firm, it is easier for men to integrate socially than for women. By formalizing these process for all new hires, everyone (including socially awkward men) benefits. Because these benefits compensate for something that was easy for men but difficult for women in the context of a male-dominated workplace, these benefits would be expected to disproportionately help women. The gender-neutral nature of the proposals is important to avoid resistance and backlashes which are commonly observed responses to attempts at implementing “women-only” programs in organizations or universities.

Because most of these proposed opportunities represent new ideas on promoting women's integration into STEM careers, there is little experiential evidence on their effectiveness as described and structured in this report. For this reason, this report also presents: (1) reactions to these proposals from the practitioners who would be responsible for implementing these proposals, and (2) research designs capable of evaluating their efficacy. Where proposals could be implemented easily with minimal costs or changes to their existing efforts (e.g., managing the composition of recruitment teams), firms and universities are generally supportive of at least piloting these proposals to evaluate their efficacy. For proposals that represent greater costs or changes to existing practice (e.g., STEM-themed co-educational living groups or never hiring singletons from universities), universities and firms would need empirical evidence of the efficacy of and expected gains from such proposals. Addressing this need, this report provides sample research designs for evaluating the provided proposals.