**The Impact of the COVID-19 Pandemic on Perceived Publication Pressure Among Academic Researchers in Canada**

Celeste Suart1, Kaitlyn Neuman1, and Ray Truant1,\*

1 Department of Biochemistry and Biomedical Sciences, McMaster University, Hamilton, Ontario, Canada

\* Corresponding Author, Email: truantr@mcmaster.ca

# Supporting Material

**Supporting Appendix 1.** Online Survey Protocol.

**Supporting Table 1.** Trainee respondent goal career field following completion of studies.

**Supporting Table 2.** Location of respondents’ affiliated research institution.

**Supporting Table 3.** Respondent ethnicity.

**Supporting Table 4.** Publication Pressure Questionnaire Subscale Scores stratified by trainee goal career field after studies.

**Supporting Table 5.** Publication Pressure Questionnaire Subscale Scores stratified by location.

**Supporting Table 6.** Publication Pressure Questionnaire Subscale Scores stratified by ethnicity.

**Supporting Figure 1.** Publication pressure questionnaire subscale scores by academic position.

**Supporting Figure 2.** No significant differences in perceived publication pressure experienced by respondents with different research funding agencies.

**Supporting Table 1. Trainee respondent goal career field following completion of studies.** N= 777.

|  |  |
| --- | --- |
| **Career Field** | **N (%)** |
| Academia | 400 (51%) |
| Non-academic field (Research publication history is valued) | 312 (40%) |
| Non-academic field (Research publication history is not considered) | 65 (8%) |
| **Total** | **777 (100%)** |

**Supporting Table 2. Location of respondents’ affiliated research institution.** N=1020

|  |  |
| --- | --- |
| **Career Field** | **N (%)** |
| Alberta | 77 (8%) |
| British Columbia | 168 (16%) |
| Manitoba | 69 (7%) |
| New Brunswick | 42 (4%) |
| Newfoundland and Labrador | 40 (4%) |
| Northwest Territories | 30 (3%) |
| Nova Scotia | 47 (5%) |
| Nunavut | 19 (2%) |
| Ontario | 434 (43%) |
| Prince Edward Island | 11 (1%) |
| Quebec | 57 (6%) |
| Saskatchewan | 14 (1%) |
| Yukon | 5 (0.5%) |
| Prefer not to Answer | 7 (1%) |
| **Total** | **1020 (100%)** |

**Supporting Table 3. Respondent ethnicity.** Respondents could select multiple responses. N=1020. These categories were adapted from the Statistics Canada Visible Minority and Population Group Reference Guide, Census of Population (2016) [[66]](https://paperpile.com/c/BOvORM/EC95). Examples of respondent descriptions who chose to self-identify include: Biracial or mixed race, Canadian, Jewish, and West Indian.

|  |  |
| --- | --- |
| **Race** | **N (%)** |
| Arab | 29 (3%) |
| Black | 59 (6%) |
| Chinese | 57 (6%) |
| Filipino/a | 11 (1%) |
| Indigenous | 25 (2%) |
| Japanese | 6 (1%) |
| Korean | 10 (1%) |
| Latin American | 29 (3%) |
| South Asian | 49 (5%) |
| South East Asian | 9 (1%) |
| West Asian | 17 (2%) |
| White | 737 (72%) |
| Prefer to Self-Identify | 20 (2%) |
| Prefer not to Answer | 28 (23%) |
| **Total** | **1020 (100%)** |

**Supporting Table 4. Publication Pressure Questionnaire Subscale Scores stratified by trainee goal career field after studies.** Values represent mean score with standard deviation in brackets.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Career Field**  | **N** | **Stress** | **Attitude** | **Resources** |
| **Pre-COVID** | **Post-COVID** | **Pre-COVID** | **Post-COVID** | **Pre-COVID** | **Post-COVID** |
| Academia | 400 | 3.28 (0.76) | 3.51 (0.84) | 3.36 (0.68) | 3.44 (0.76) | 2.65 (0.63) | 2.79 (0.68) |
| Non-academic field (Research publication history is valued) | 312 | 3.05 (0.60) | 3.20 (0.67) | 3.21 (0.61) | 3.24 (0.65) | 2.78 (0.65) | 2.82 (0.54) |
| Non-academic field (Research publication history is not considered) | 65 | 3.24 (0.66) | 3.37 (0.62) | 3.33 (0.72) | 3.39 (0.70) | 2.95 (0.58) | 3.09 (0.51) |
| **Total Population** | 1020 | 3.20 (0.72) | 3.38 (0.82) | 3.31 (0.66) | 3.37 (0.72) | 2.65 (0.62) | 2.78 (0.63) |

**Supporting Table 5. Publication Pressure Questionnaire Subscale Scores stratified by location.** Values represent mean score with standard deviation in brackets.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location**  | **N** | **Stress** | **Attitude** | **Resources** |
| **Pre-COVID** | **Post-COVID** | **Pre-COVID** | **Post-COVID** | **Pre-COVID** | **Post-COVID** |
| Alberta | 77 | 3.05 (0.68) | 3.16 (0.83) | 3.12 (0.62) | 3.15 (0.73) | 2.77 (0.57) | 2.85 (0.67) |
| British Columbia | 168 | 3.08 (0.58) | 3.29 (0.68) | 3.22 (0.63) | 3.31 (0.69) | 2.71 (0.58) | 2.80 (0.57) |
| Manitoba | 69 | 3.07 (0.55) | 3.15 (0.58) | 3.19 (0.51) | 3.14 (0.60) | 2.86 (0.46) | 2.96 (0.49) |
| New Brunswick | 42 | 2.92 (0.54) | 3.10 (0.52) | 3.19 (0.55) | 3.15 (0.41) | 2.86 (0.48) | 2.88 (0.40) |
| Newfoundland and Labrador | 40 | 3.13 (0.64) | 3.19 (0.65) | 3.17 (0.71) | 3.20 (0.67) | 2.71 (0.54) | 2.80 (0.57) |
| Northwest Territories | 30 | 3.08 (0.39) | 2.91 (0.51) | 3.09 (0.37) | 3.08 (0.35) | 2.88 (0.39) | 2.95 (0.35) |
| Nova Scotia | 47 | 3.06 (0.69) | 3.08 (0.82) | 3.15 (0.61) | 3.17 (0.65) | 2.78 (0.58) | 2.81 (0.51) |
| Nunavut | 19 | 2.91 (0.30) | 2.89 (0.19) | 3.06 (0.41) | 2.96 (0.49) | 3.02 (0.35) | 3.07 (0.33) |
| Ontario | 434 | 3.35 (0.81) | 3.60 (0.88) | 3.46 (0.70) | 3.55 (0.74) | 2.51 (0.66) | 2.70 (0.70) |
| Prince Edward Island | 11 | 2.76 (0.42) | 3.03 (0.35) | 2.89 (0.55) | 3.07 (0.59) | 3.12 (0.45) | 3.00 (0.37) |
| Quebec | 57 | 3.27 (0.73) | 3.53 (0.91) | 3.42 (0.70) | 3.48 (0.88) | 2.53 (0.60) | 2.68 (0.73) |
| Saskatchewan | 14 | 3.42 (0.89) | 3.54 (0.82) | 3.37 (0.86) | 3.50 (0.87) | 2.40 (0.78) | 2.50 (0.56) |
| Yukon | 5 | 2.80 (0.14) | 2.70 (0.46) | 3.13 (0.32) | 3.03 (0.36) | 3.20 (0.32) | 3.00 (0.26) |
| Prefer not to Answer | 7 | 3.69 (1.22) | 3.95 (1.26) | 3.04 (0.92) | 2.98 (1.11) | 2.61 (0.65) | 2.88 (0.74) |
| **Total Population** | 1020 | 3.20 (0.72) | 3.38 (0.82) | 3.31 (0.66) | 3.37 (0.72) | 2.65 (0.62) | 2.78 (0.63) |

Respondents from Ontario had significantly higher pre-COVID Stress scores (M=3.35) than British Columbia (M=3.08, p=0.0025, one-way ANOVA) and New Brunswick (M=2.92, p=0.014, one-way ANOVA). Post-COVID Ontario respondents had significantly higher Stress scores (M=3.60) than Alberta (M=3.16, p=0.0004, one-way ANOVA), British Columbia (M=3.29, p=0.0016, one-way ANOVA), Manitoba (M=3.15, p=0.0011, one-way ANOVA), New Brunswick (M=3.10, p=0.0067, one-way ANOVA), Northwest Territories (M=2.91, p=0.0003, one-way ANOVA), Nova Scotia (M=3.08, p=0.0013, one-way ANOVA), and Nunavut (M=2.89, p=0.01, one-way ANOVA).

Respondents from Ontario had significantly higher pre-COVID Attitude scores (M=3.46) than Alberta (M=3.12, p=0.003, one-way ANOVA) and British Columbia (M=3.22, p=0.0054, one-way ANOVA). Following the COVID-19 pandemic, Ontario respondents had significantly higher Attitude scores (M=3.55) than Alberta (M=3.15, p=0.0004, one-way ANOVA), British Columbia (M=3.31, p=0.017, one-way ANOVA), Manitoba (M=3.14, p=0.0007, one-way ANOVA), New Brunswick (M=3.15, p=0.038, one-way ANOVA), Northwest Territories (M=3.08, p=0.033, one-way ANOVA), Nova Scotia (M=3.17, p=0.033, one-way ANOVA), and Nunavut (M=2.96, p=0.029, one-way ANOVA).

Respondents from Ontario had significantly lower pre-COVID Resources scores (M=3.46) than Alberta (M=2.77, p=0.04, one-way ANOVA), British Columbia (M=2.71, p=0.019, one-way ANOVA), Manitoba (M=2.86, p=0.00066, one-way ANOVA), New Brunswick (M=2.86, p=0.026, one-way ANOVA), and Nunavut (M=3.02, p=0.026, one-way ANOVA). There were no significant differences in post-COVID Resources scores between respondent locations.

**Supporting Table 6. Publication Pressure Questionnaire Subscale Scores stratified by ethnicity.** Values represent mean score with standard deviation in brackets.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location**  | **N** | **Stress** | **Attitude** | **Resources** |
| **Pre-COVID** | **Post-COVID** | **Pre-COVID** | **Post-COVID** | **Pre-COVID** | **Post-COVID** |
| Arab | 29 | 2.89 (0.71) | 3.23 (0.79) | 3.29 (0.78) | 3.47 (0.67) | 2.57 (0.64) | 2.74 (0.59) |
| Black | 59 | 2.93 (0.44) | 3.15 (0.66) | 3.21 (0.65) | 3.26 (0.74) | 2.76 (0.61) | 2.75 (0.54) |
| Chinese | 57 | 3.07 (0.63) | 3.28 (0.66) | 3.26 (0.69) | 3.34 (0.70) | 2.63 (0.64) | 2.80 (0.58) |
| Filipino/a | 11 | 3.11 (0.62) | 3.18 (0.74) | 2.80 (0.44) | 3.06 (0.64) | 2.89 (0.55) | 3.05 (0.35) |
| Indigenous | 25 | 3.05 (0.55) | 3.08 (0.61) | 3.18 (0.61) | 3.15 (0.75) | 2.68 (0.58) | 2.77 (0.65) |
| Japanese | 6 | 3.03 (0.37) | 3.11 (0.99) | 3.25 (0.55) | 3.25 (0.58) | 3.11 (0.31) | 3.14 (0.46) |
| Korean | 10 | 3.12 (0.77) | 3.17 (0.89) | 3.23 (0.56) | 3.33 (0.65) | 2.67 (0.45) | 2.63 (0.44) |
| Latin American | 29 | 3.32 (0.82) | 3.59 (0.85) | 3.53 (0.74) | 3.49 (0.82) | 2.60 (0.70) | 2.72 (0.70) |
| South Asian | 49 | 3.36 (0.67) | 3.55 (0.87) | 3.35 (0.69) | 3.59 (0.72) | 2.57 (0.54) | 2.78 (0.70) |
| South East Asian | 9 | 3.02 (0.47) | 3.19 (0.72) | 3.22 (0.67) | 3.17 (0.54) | 2.69 (0.61) | 2.69 (0.63) |
| West Asian | 17 | 3.09 (0.64) | 3.29 (0.71) | 3.36 (0.40) | 3.39 (0.52) | 2.76 (0.49) | 2.89 (0.37) |
| White | 737 | 3.21 (0.72) | 3.38 (0.81) | 3.32 (0.65) | 3.36 (0.71) | 2.64 (0.61) | 2.77 (0.64) |
| Prefer to Self-Identify | 20 | 3.29 (1.13) | 3.53 (1.21) | 3.55 (0.68) | 3.72 (0.63) | 2.63 (0.83) | 2.59 (0.79) |
| Prefer not to Answer | 28 | 3.73 (0.78) | 3.96 (0.91) | 3.51 (0.72) | 3.53 (0.80) | 2.62 (0.69) | 2.88 (0.62) |
| **Total Population** | 1020 | 3.20 (0.72) | 3.38 (0.82) | 3.31 (0.66) | 3.37 (0.72) | 2.65 (0.62) | 2.78 (0.63) |



**Supporting Figure 1. Publication pressure questionnaire subscale scores by academic position.** Paired Student’s t-test with Bonferroni correction. \* P≤0.05, \*\* P≤0.01, \*\*\* P≤0.001, \*\*\*\* P≤0.0001. (A) Graduate Student: Master’s Degree Scores. N= 166. (B) Graduate Student: Doctoral Degree Scores. N=410. (C) Postdoctoral Fellow Scores. N=201. (D) Principal Investigator: Early Career Scores N=121. (E) Principal Investigator: Mid-Career Scores N=66. (F) Principal Investigator: Senior Scores N=66.



**Supporting Figure 2. No significant differences in perceived publication pressure experienced by respondents with different research funding agencies.** One-way ANOVA, N=306-393. P>0.64 for all comparisons. CIHR: Canadian Institutes of Health Research, NSERC: Natural Sciences and Engineering Research Council, SSHRC: Social Sciences and Humanities Research Council. (A) Scores Pre-COVID. (B) Scores Post-COVID.