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How did College Students with and Without Disabilities Experience the First wave of the COVID-19 Pandemic? A Stress and Coping Perspective

Simon Larose[1] · Julien S. Bureau[1] · Caroline Cellard[1] · Michel Janosz[2] · Catherine Beaulieu[3] · Geneviève Boisclair Châteauvert[1] · Alexandre Girard-Lamontagne[4]

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Abstract
The COVID-19 pandemic has overturned daily routines across the entire planet. And newly arrived college students in the fall of 2019 were no exception. In addition to adjusting to the college transition, they had to cope with the multiple consequences of the pandemic's first wave (e.g., confinement, quarantine, physical distancing, remote learning, job loss). To date, it is unknown how this experience has affected students, and particularly the most vulnerable. The main objective of this study was to examine, from a stress and coping perspective, how college students with and without disability experienced the first COVID-19 wave. A longitudinal study using online surveys was conducted in a sample of 1,465 students (mean age = 18.2) attending college in the province of Québec (Canada), of whom 42% disclosed a disability (i.e., ADHD, mental health disorder, or learning problem) at college entry. Exposure to COVID-19 varied according to disability type, study region, and study program. After controlling for exposure, students' initial adjustment to college, and high school GPA, students with a disability, and particularly those presenting a mental health disorder, experienced greater stress and had greater difficulty coping with the situation compared to students without a disability. Generally, girls and students attending a college in an urban area were more affected by the pandemic. Results are discussed with a view to designing preventive measures for at-risk students who enter college during a pandemic.

Keywords COVID-19 · Stress appraisal, college students · Disabilities · Higher education

✉ Simon Larose
simon.larose@fse.ulaval.ca

[1] Université Laval, Quebec City, Canada

[2] Université de Montréal, Montreal, Canada

[3] Cégep Saint-Laurent, Montreal, Canada

[4] Centre collégial de soutien à l'intégration, Cégep de Sainte-Foy, Quebec City, Canada

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In December 2019, the first portents of a worldwide pandemic appeared in the Wuhan region of China. The coronavirus disease (COVID-19) invaded and spread throughout most countries worldwide, with the first wave resulting in almost 1.3 million deaths (World Health Organization, Nov.13, 2020[1]). Canada did not escape, with almost 300,000 active cases and over 10,000 deaths (Government of Canada, Nov. 10, 2020[2]). At the end of 2020, the province of Québec reported the highest number of positive cases and deaths in Canada (121,195 cases and 6,586 deaths, Nov. 13, 2020, Government of Québec, 2020[3]).

Although the pandemic has proven particularly deadly for persons aged 70 and over and/or with pre-existing conditions (e.g., obesity, heart conditions), researchers largely agree that the protective measures that it has generated (e.g., quarantine, confinement/deconfinement, physical distancing) have also affected mental health on a population scale (Haesebaert et al., 2020; Wang & Goodman, 2022). A cross-sectional study in 600 young Chinese adults suggests a growing prevalence of psychosomatic disorders in this population since the pandemic arrived (Liang et al., 2020): 40% of the participants reported psychological problems since the pandemic, and almost 15% experienced symptoms similar to post-traumatic disorder. Similar findings were reported in a convenience sample of U.S. college students, where 52% met the clinical cutoff for depression and/or anxiety during the first wave (Wang & Goodman, 2022). Another cross-sectional study in China suggests that young adults (<35 years) and health care workers were more affected psychologically by the first wave than other members of the population (Huang & Zhao, 2020).

These preliminary data suggest that exposure to COVID-19 could have deleterious effects on young adults' adjustment in multiple life domains (Horesh & Brown, 2020). These effects could be particularly strong for higher education students with disabilities, who already had challenges integrating into and succeeding at college before COVID-19 came along (Ducharme et al., 2018; DuPaul et al., 2009; Nordstrom et al., 2014; Haesebaert et al., 2020). Why? Because many studies suggest that the pandemic also exacerbated institutional vulnerabilities (e.g., service interruptions, unequal access to distance learning, staff shortages) (see, e.g., Conseil supérieur de l'éducation, 2021), which made it harder and more complicated for students with disabilities to adapt. Using the data from an ongoing longitudinal study on students undergoing the college transition, the present study aims to document the stress that college students experienced during the first wave of the pandemic, with a particular focus on students with disabilities (i.e., deficit hyperactivity disorder – ADHD, learning problems, and/or mental health disorders). We also explore the direct and indirect effects of certain factors (i.e., gender, disability type, enrollment in a biological technologies program, study region, and financial hardship) on the stress felt by college students. The next section presents the theoretical framework for the study.

[1] World Health Organization (WHO). https://covid19.who.int/.

[2] Government of Canada. Coronavirus disease (COVID-19). https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html.

[3] Government of Québec. Situation of the coronavirus (COVID-19). https://www.quebec.ca/en/health/health-issues/a-z/2019-coronavirus/situation-coronavirus-in-quebec/.

A Stress and Coping Perspective

The transactional model of stress and coping developed by Lazarus and Folkman (1984) and applied to the context of potentially traumatic events (Matthieu & Ivanoff, 2006) provides the theoretical framework for this study. This model proposes that a student's subjective appraisal of an event (e.g., the COVID-19 pandemic) is determinant for the stress that is subsequently felt. More specifically, the model describes two individual appraisal steps: primary appraisal and secondary appraisal. The primary appraisal is an evaluation of the potential consequences of the event for oneself. For instance, some students may have felt threatened by the first wave of the pandemic. They may have feared negative effects for their development (e.g., in terms of health or finances). Others may have perceived the pandemic as a positive life challenge. They may have used the confinement to take care of themselves and their family and friends, or to make some adjustments in their life. In short, the primary appraisal determines in part the level of stress associated with the event. The secondary appraisal is an evaluation of one's ability to cope with the event. For example, students may have perceived that they had adequate resources (inner and outer) to cope with the first pandemic wave, or they may have felt that the situation exceeded their ability to cope and that there were few people to turn to for help. The secondary appraisal may act to increase the stress level. Once the two appraisal steps are completed, the stress that they generate generally influences the students' use of coping strategies (i.e., stress-reducing behaviors). For instance, some students may have been proactive during the first wave by keeping up-to-date on how the situation was evolving, and they may have taken advantage of the confinement to practice positive activities (Umucu & Lee, 2020). Others may have become less resilient, acted more defensively, and attempted to minimize the consequences of the situation (Ye et al., 2020; Firth et al., 2010; Geisthardt & Munsch, 1996). They may also have fallen into behaviors that were harmful to their long-term health, such as alcohol and drug abuse or addictive gaming (Umucu & Lee, 2020).

With this model in mind, we sought to measure students' perceptions of how the first wave of the pandemic affected them and their perceptions of the strategies they used to cope with the pandemic-related consequences (e.g., quarantine, confinement, and obligatory sanitation measures). From this model, we infer that the students' perceptions of threat and loss and their use of defensive management strategies (minimizing the event and negative behaviors such as increased substance use) are indicators of negative stress. Conversely, perceptions of the pandemic as a challenge, use of positive activities, and information quest are considered as positive stress indicators.

College Adjustment Challenges During the Transition

In order to document stress in students during the first wave of the pandemic, we needed to control for initial college adjustment status and academic success. We assumed that the stress students experienced since pandemic onset would be confounded with the stress associated with the college transition. In fact, previous studies clearly show that this transition is associated with several adjustment problems in students, notably higher anxiety and fear of failure (Doane et al., 2015; Larose et al., 2005) and lower academic and social adjustment (Larose et al., 2019). These changes in adjustment indicators may be explained by

students' concerns, particularly about finances, academic grades, separation from the family, social relationships, and plans for the future (Wang & Goodman, 2022). It has also been demonstrated that students with disabilities find the transition harder compared to their peers without disabilities. For example, it has been demonstrated that fewer students with than without ADHD graduate from college (Sanford et al., 2011; DuPaul et al., 2009), and that more students with than without anxiety disorders or depressive symptoms are at risk for problematic social relations at college and somatic disorders in the first year of college (Nordstrom et al., 2014; Meunier-Dubé & Marcotte, 2017; Larose et al., 2019). Other studies have shown that students with mental health disabilities overcome more major barriers to online learning than other groups of students (McManus et al., 2017). Although these adjustment problems have been associated with institutional constraints and barriers (e.g., limited access to support services, lack of inclusive practices in class, sometimes overly medical conceptions of disability by school staff) (Evans et al., 2017), they could contribute to higher stress in this subpopulation. Taken together, these findings indicate the need to control for students' initial adjustment and academic performance in the analysis of perceived stress due to the pandemic.

Other Personal and Contextual Factors

Beyond student's initial adjustment, academic performance, and disability status, other factors could exacerbate the stress they may have experienced in the first wave. For example, it has been demonstrated that psychological vulnerability during the COVID-19 outbreak was greater in disadvantaged areas and less educated populations (Aristovnik et al., 2020; Kavčič et al., 2020), younger populations (Kavčič et al., 2020), first-year college students (Aristovnik et al., 2020), and students whose parents lost their jobs or had their working hours cut (Wang & Goodman, 2022). The experience of the transition to college while a global pandemic raged, combined with initiation into college structures, services, and functioning and the unravelling of social and economic capital during the transition could explain the greater vulnerability of these subpopulations.

Other studies have shown that boys and students enrolled in biological technologies (or applied health) programs were generally more negatively affected by the pandemic than girls and students in other programs, notably when satisfaction with the study program was the main outcome (Aristovnik and colleagues, 2020). On the other hand, when the studied outcome is wellbeing or psychological functioning, the pandemic seems to impact females more negatively than males (Haesebaert et al., 2020; Kavčič et al., 2020). From the onset of the first wave, governments requisitioned students enrolled in health programs to care for elderly persons who had contracted COVID-19. However, these initiatives involved more girls than boys, and girls have been shown to be more sensitive to environmental stresses than boys (McDonough & Walters, 2001). This could have accentuated the vulnerability of girls and students in health programs during the first wave, notably in terms of their wellbeing and psychological functioning. Furthermore, although boys seem to have been less affected psychologically by the pandemic, some studies have demonstrated that their academic grades were more strongly affected (Breaux et al., 2021). This could lower their satisfaction with their academic program without necessarily increasing their stress symptoms.

The Present Study: Goals and Hypotheses

This study had three goals. First, we wanted to describe how college students in Québec experienced and perceived the first wave of the pandemic, with particular attention to their subjective appraisals. Consistent with Lazarus and Folkman's (1984) model, we aimed to describe the degree of exposure to COVID-19, perceptions of the associated stress (i.e., loss, threat, and challenge), and the coping strategies used (i.e., positive activities, negative activities, information quest, and minimization). Second, we wanted to determine whether these self-perceptions and perceptions of coping varied according to disability status. According to the literature, we expected students with disabilities to be more stressed during the first wave of the pandemic and hence to more negatively appraise the consequences for themselves and their coping strategies. We also predicted that these differences would remain substantial even when controlling for the degree of COVID-19 exposure, student's initial adjustment to college before the pandemic, and high school grades (i.e., grade point average – GPA). The third goal was to explore the direct effect of five personal and contextual factors (i.e., gender, disability type, financial hardship, study program, and study region) on perceived stress and coping during the first pandemic wave, as well as their moderating effects between disability status and perceived stress and coping. In line with the literature, we expected girls (vs. boys), students with mental health problems (vs. students with other disabilities), students who received a loan (vs. students who were ineligible), and students in a biological technologies program (vs. students in other programs) to be more stressed and to have less positive perceptions of their coping strategies. We also presumed that the stress would be higher in urban than rural areas due to the higher prevalence of COVID-19 in Montreal and Québec City during the first wave. Finally, we expected that some of these factors would amplify the association between disability status and stress indicators.

Method

Participants and Procedure

The participants for the present study had taken part in the ESH-Transition study (*Étudiants en Situation de Handicap pendant la Transition* / Disability students during the transition) headed by the first author of the present article. They were attending 10 colleges in the province of Québec (Canada)[4]: 32.9% in Montreal, 35.3% in Québec City, and 31.8% in central Québec. In the province of Québec, Montreal and Québec City are the most populated regions, with respectively 4,099,000 and 800,296 inhabitants. The Central Québec region contains smaller towns and villages spread out over a much greater land area, where the economy is basically farming and the agri-food industry and the population is just 242,399. In this study, Montreal and Québec City are considered urban regions and Central Québec is considered a rural region.

Participants were recruited in late fall 2019 as part of a longitudinal study on the college transition. The data presented here were obtained from participants who responded at two

[4] In Québec, the college and university education systems are separate. After completing 11 years of grade school (6 years primary, 5 years secondary), students can enter college: either 2 years of general pre-university training (e.g., social studies, sciences, arts, administration) or 3 years of technical training.

measurement times: fall 2019 (October–November) and spring 2020 (April–June; n = 1465; 78.6% girls; M_{age} = 18.2 years, SD = 3.8). At Time 2, Québec was in full lockdown due to the first pandemic wave. The students were enrolled in various programs: pre-university (57.0%), technical (35.2%), or Springboard[5] (7.7%). All students were in the first fall term of 2019 (93.7%) or in their first term at the current college (6.3%). Because the initial aim of the study was to investigate students with disabilities, students who presented with a disability were oversampled. Thus, in fall 2019, 41.2% of the sample disclosed at least one disability, of which 50% were an ADHD, 48% a mental health disorder (e.g., anxiety disorder, mood disorder), and 22% a learning or language problem (e.g., dyslexia, dysphasia). Furthermore, 37% of the students presented comorbidity.

Measures

Sociodemographics and Risk Factors

Data were gathered in October 2019 (Time 1) to characterize the sample and operationalize the personal and contextual factors: age, gender, study region (Montreal vs. Québec City vs. central Québec), access or not to a college loan or bursary (financial hardship), disclosed disability (Yes or No), disability type (i.e., ADHD, learning problem, or mental health disorder), and study program. For purposes of this article, the study programs were grouped into two categories according to whether it involved biological technologies (e.g., medical care) or not. We used this categorization due to the government of Québec's urgent appeal to health care professionals and students to volunteer at residential and long-term care centers (*centres d'hébergement et de soins de longue durée* – CHSLDs), where they would face situations of major viral transmission (see: https://www.lapresse.ca/covid-19/2020-04-13/des-professeurs-obliges-d-aller-travailler-dans-les-hopitaux-et-chsld; https://montrealgazette.com/news/quebec/covid-19-premier-legault-appeals-for-help-to-staff-chsld-centres).

COVID Questionnaire (QCovid19)

The degree of exposure to COVID-19 and perceived stress and coping were measured with a questionnaire (QCovid19) developed by our team and inspired by Lazarus and Folkman's (1984) transactional stress model. Two members of the research team created an initial set of 40 items to assess, in addition to exposure, the core constructs of Lazarus and Folkman's model adapted to the COVID-19 context: perceived threat, loss, challenge, proactive coping strategies (i.e., use of positive activities and information quest), and defensive coping strategies (denial and negative activities, e.g., drug consumption, gaming). The two developers of the items, the principal researcher, and a college student then held discussions and eliminated ambiguous items by consensus decision. The final version contained 24 items divided into three parts (see Table 1).

Part A (6 items) measures the degree of exposure to COVID-19. Respondents indicated whether (0) or not (1) they had experienced symptoms of, were tested for, or diagnosed with positive COVID-19 between March and June 2020. The same questions were asked regard-

[5] Springboard to a DCS: a pathway that helps students upgrade their qualifications so they can enter or be readmitted to college. See http://www.education.gouv.qc.ca/fileadmin/site_web/documents/enseignement-superieur/081.06-Tremplin-DEC-VA.pdf.

Table 1 Covid-19 questionnaire items and proportions of students who agreed

Part A	Yes (%)
I have experienced symptoms like those of COVID-19.	7.8
I have been tested for COVID-19.	3.7
I have tested positive for COVID-19.	0.4
Someone in my social network (parent, friends, acquaintances) has experienced symptoms like those of COVID-19.	33.0
Someone in my social network (parent, friends, acquaintances) has been tested for COVID-19.	38.5
Someone in my social network (parent, friends, acquaintances) has tested positive for COVID-19.	19.4
Part B	Strongly or totally agree (%)
I feel shame, sadness, and anger about the pandemic.	26.2
I must sacrifice many important activities in my life due to the pandemic.	59.2
I am worried about seeing changes in my life because of the pandemic.	45.0
I am afraid that I will have to live differently because of the pandemic.	39.4
The pandemic will make me a better person.	32.0
I see the pandemic as a positive challenge in my life.	32.4
Part C	Strongly or totally agree (%)
I make time to relax.	57.7
I engage in entertaining activities (reading, walking, games).	67.8
I spend more time than usual playing video games, by myself or online with other people.	38.2
I make time to laugh.	63.7
I spend quality time with my family.	57.3
I have been drinking alcohol or using drugs more often than usual.	11.5
I stay informed about the pandemic.	60.0
I watch press conferences by the government and the public health authorities and agencies.	39.4
I visit websites that document the pandemic.	33.4
I have not changed my lifestyle since the outbreak of COVID-19.	8.7
I feel that society is alarmist regarding the pandemic.	21.4
I do not feel anything regarding the pandemic.	12.2

ing individuals in their social network (i.e., friends, parents, grandparents). The degree of exposure was then calculated by summing the averages for each response (0 = no exposure; 1 = maximum exposure). Part B (6 items) measures the effects of the COVID-19 pandemic on the participants in terms of three perceptions: loss (2 items), threat (2 items), and challenge (2 items). Participants rated their responses on a Likert scale from 1 (Completely disagree) to 5 (Completely agree). Part C (12 items) measures four perceptions of their coping management strategies: positive activities (4 items), negative activities (2 items), information quest (3 items), and denial (3 items). Responses were rated on a Likert scale from 1 (Completely disagree) to 5 (Completely agree).

A confirmatory factor analysis (CFA) conducted on the 24 items and based on an 8-factor structure and 94 parameters showed good quality, as indicated by the fit indices (CFI = 0.93, TLI = 0.91, RMSEA = 0.04 [0.03, 0.04], SRMR = 0.07; $\chi^2(224) = 665.96$, $p < .001$). The factor loadings for 22 items exceeded 0.43 (ranging from 0.436 to 0.953, $p < .0001$). Only two

items loaded poorly on the theoretical dimensions to which they were presumed to belong (coping using negative activities: "I spend more time than usual playing video games, by myself or online with other people" (0.27, $p < .0001$); and coping using denial: "I feel that society is alarmist about the pandemic" (0.12, $p < .0001$)).

The analysis of internal consistency (Chronbach's alpha) revealed several relatively strong questionnaire dimensions. All the alpha values for degree of exposure ($\alpha = 0.90$), threat ($r = .80$), challenge ($r = .68$), positive activities ($\alpha = 0.75$), and information quest ($\alpha = 0.78$) exceeded 0.60, with item-total correlations ranging from 0.35 to 0.70. The alpha value for denial was slightly lower, at 0.53 (item-total correlations ranging from 0.40 to 0.65). However, because removing this item reduced the consistency, we retained all the items. Two other dimensions were more problematic, with between-item correlations of 0.35 (loss) and 0.14 (negative activities). Note, however, that these two dimensions include only two items each, which precludes consistency calculation. Despite these minor structural problems, we decided to keep these two latter dimensions intact because their items have a certain face validity for young adults (video gaming as a way to lower pandemic-related stress, and lack of concern about the effects of the pandemic thanks to magical thinking).

Initial College Adjustment and High School Grade Point Average (GPA)

During the fall college term (Time 1: October 2019), the participants responded to the French version of the Student Adaptation to College Questionnaire (SACQ-F, Larose et al., 1996). The questionnaire contains 23 items that measure three dimensions: academic adjustment (10 items, e.g., "I am satisfied with my academic performance in college," $\alpha = 0.80$), social adjustment (6 items, e.g., "I am somewhat satisfied with my social life at college, $\alpha = .85$), and personal and emotional adjustment (7 items, e.g., "I find it very hard to deal with the stress of college life," reverse coded, $\alpha = .76$). Responses were rated on a Likert scale from 1 (Completely disagree) to 5 (Completely agree). A global college adjustment score was used as a control variable in the analysis. The validity and reliability of the SACQ-F has been well demonstrated (Larose et al., 1996). The participants also reported their grade point average (GPA) in high school at Time 1 (maximum = 100), which was used as an additional control variable.

Analysis Procedure

The results are presented in three sets. First, we present the responses to the 24 items of the QCovid19 to describe the students' overall experience and perceptions of the pandemic. More precisely, we report the percentages of students who responded "Yes" to the items addressing COVID-19 exposure (6) and the percentages who responded "Strongly agree" or "Completely agree" to the items addressing stress (6) and coping strategies (12). Contingency analysis (X^2) was conducted on the exposure items to assess the scope of the risk factors. Second, based on the scale scores, we examined whether perceived stress and coping during the pandemic (Time 2) varied according to whether or not the student had a disability while controlling for exposure (Time 2), initial college adjustment (Time 1), and high school GPA (Time 1). To do so, we ran two multivariate analyses of covariance followed by ANCOVAs. The first analysis included the three perceived stress scores as dependent variables, disability status as the main factor, and COVID-19 exposure, initial

college adjustment, and high school GPA as covariables. The second analysis included the same covariables and factors as well as the four coping scores. The effect sizes are also presented. Third, we tested the effects of our five personal and contextual factors (disability type, study region, financial hardship, study program, and gender) on the stress and coping variables and on the relationship between disability status and perceived stress. We began by testing all triple and quadruple interactions that included the variable disability status as a moderator (e.g., Disability status X Study region X Gender; Disability status X Study region X Study program X Gender). As no significant interactions were obtained, we then examined double effects. Thus, we ran multivariate analyses while considering the moderating variables one at a time. When the Disability status X Personal/Contextual factor interaction was significant, we decomposed the interaction effect for each moderating category level by level. In the case of disability type, we defined three a priori contrasts (Without disability vs. ADHD; Without disability vs. Mental health disorder; Without disability vs. Learning problem) and compared the contrast effect sizes.

Results

The COVID-19 Experience

Table 1, Part A presents the exposure items from the QCovid19 and the percentages of students that responded "Yes" to the items. Although 7.8% of respondents had COVID-19 symptoms, less than half of these (i.e., 3.7%) got tested, and very few received a positive diagnosis (i.e., 0.4%). These results are similar to those published by the *Institut National de Santé Publique du Québec* (Québec's national public health institute – INSPQ, 2022), with province-wide virus prevalence rates in the first wave of 0.217% and 0.175% for females and males aged 10 to 19 years and 0.727% and 0.441% for females and males aged 20 to 29 years. Although more 20- to 29-year-old females than males appeared to catch the virus at the provincial level, this difference was not apparent in our sample of college students. Otherwise, the proportions of students who could have been indirectly affected by COVID-19 were much higher. Over one-third (i.e., 33%) of the students knew someone in their social network who had symptoms and/or got tested (i.e., 38.5%), and almost one in five (i.e., 19.4%) knew someone in their social network who had a positive diagnosis.

The responses to some of the exposure items varied according to certain personal and contextual factors. Larger proportions of students with than without disability had symptoms (9.5% vs. 6.6%; X^2 (1)=3.77, $p<.05$) and were tested (5.3% vs. 2.8%; X^2 (1)=6.09, $p<.01$). A finer analysis by disability type shows these differences mainly for students with a mental health disorder. Thus, 10.7% of students with a mental health disorder had symptoms compared to 6.6% of students without disability, X^2 (1)=5.18, $p<.03$. Moreover, 6.0% of students with a mental health disorder got tested compared to 2.8% of students without disability, X^2 (1)=6.63, $p<.02$. Students with ADHD or a learning disorder did not differ from students without disability on perceived symptoms or getting tested. In addition, positive COVID-19 diagnosis did not vary with the presence (or not) of disability, regardless of disability type. Finally, only one difference emerges in the variables concerning indirect exposure to COVID-19: more students with learning problems than students without dis-

ability knew someone in their social network who had COVID-19 symptoms (34% vs. 22%; X^2 (1) = 5.82, p < .02).

Unsurprisingly, the proportions of students who knew someone who had symptoms, X^2 (2) = 12.38, p < .005, got tested, X^2 (2) = 9.52, p < .01, or received a positive diagnosis, X^2 (2) = 16.88, p < .001, varied across the study regions. Significantly more students who attended a college on the Island of Montreal compared to Québec City knew someone who had symptoms (37% vs. 27%), got tested (43% vs. 33%), or received a positive diagnosis (25% vs. 14%). The proportions for central Québec were more similar to those for Montreal than Québec City, [at 36% (symptoms), 41% (tested), and 20% (positive diagnosis)]. Student's gender and financial hardship status (loan or bursary or not) showed no associations with the exposure variables.

In addition, the degree of exposure to COVID-19 varied with the study program. Twice as many students in a biological technologies program had gotten tested compared to students in other programs (7.3% vs. 3.2%, X^2 (1) = 7.82, p < .01). Furthermore, more students in biological technologies knew someone with a positive diagnosis (29.8% vs. 16.8%, X^2 (1) = 5.22, p < .05).

Table 1, Part B presents the stress items and the proportions of students who responded "Strongly agree" or "Completely agree" on the items. Almost one-quarter of the students reported feelings of guilt, sadness, or anger regarding the pandemic, and almost 60% had dropped several activities that were important to them. Nearly 40% were worried about how their lives would change in the future. On the other hand, one-third also felt that the pandemic represented a positive challenge that would make them a better person in the end.

Table 1, Part C describes the students' coping strategies. Most students found ways to relax during the first wave of the pandemic (58%), engaged in diverting activities (68%), spent quality time with their family (57%), or found things to laugh about (64%). A non-negligible proportion spent more time than usual playing video games by themselves or online with others (38%) or consumed more alcohol and/or drugs than usual (12%). Although 60% said they kept themselves informed about the pandemic, only 39% listened to press briefings by government and public health officials, and only 33% consulted websites to find information. Finally, one in five students felt that people were generally being alarmist about the situation, 12% had no feelings in particular, and slightly less than 9% said they had not changed their living habits at all. The effects of the risk factors on perceived stress and coping are examined in the third set of results, based on the scale scores.

Effects of Disability Status on Stress and Coping During the Pandemic

Table 2 presents the average scores for perceived stress and coping, adjusted for three covariables (i.e., initial college adjustment, high school GPA, and COVID-19 exposure) and as a function of the factor Disability status. A first MANCOVA performed on the three stress scores (loss, threat, and challenge) indicated a significant multivariate effect of disability status, F (3, 1247) = 3.54, p < .02, partial eta^2 = 0.008, after including the covariables. Univariate covariance analysis results showed that students with disability perceived greater stress than students without disability. Thus, students with disability felt more negatively about the pandemic and felt more strongly that they had sacrificed parts of their lives compared to students without disability, F (1,1249) = 6.86, p < .01, partial eta^2 = 0.005. They were also more worried about how the pandemic would change their lives, F (1,1249) = 8.28,

Table 2 Stress and coping variables as a function of disability status

Stress and coping variables	Students with disability	Students without disability
	M (ES)	*M (ES)*
Perceptions of loss	3.20 (0.05)	3.03 (0.04)
Perceptions of threat	3.19 (0.06)	2.95 (0.05)
Perceptions of challenge	2.81 (0.06)	2.90 (0.04)
Coping through positive activities	3.70 (0.04)	3.74 (0.03)
Coping through negative activities	2.21 (0.05)	2.17 (0.04)
Coping through information quest	3.24 (0.05)	3.18 (0.04)
Coping through minimization	2.02 (0.04)	2.07 (0.03)

Notes. Scores may vary theoretically from 1 to 5. Mean scores are adjusted for three covariates: student's degree of Covid19 exposure (Time 2; M = 0.17), initial adjustment to college (Time 1; M = 3.50), and grade point average (GPA) in high school (Time 1; M = 81.9)

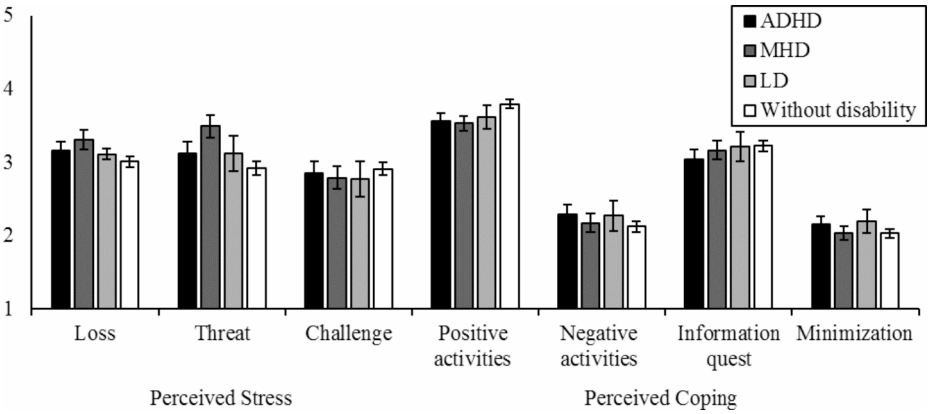

Fig. 1 Perceived stress and coping as a function of disability type

$p < .005$, partial $eta^2 = 0.007$. However, perceptions of the pandemic as a challenge did not vary as a function of disability status. The second multivariate analysis considered the four coping scores (positive activities, negative activities, information quest, and minimization). The multivariate effect of disability status on coping was not significant, $F(4, 1298) = 0.79$, $p = .53$, after including the covariables.

Moderating Effects of Personal and Contextual Factors

Disability type clearly influenced the pandemic's effects on perceived stress (see Fig. 1). The above-presented results are fully explained by the presence of a mental health disorder. The covariance analysis results indicate that students with a mental health disorder perceived the pandemic as more threatening, $F(1, 1083) = 21.54$, $p < .0001$, partial $eta^2 = 0.020$, and felt that they had lost more from their lives, $F(1, 1082) = 10.45$, $p < .0001$, partial $eta^2 = 0.010$, compared to students without disability. However, students with ADHD or a learning problem showed no distinctions from students without disability on these variables. Moreover, disability type was not associated with perceived challenge.

Disability type was associated with only one coping variable. Students with ADHD reported doing fewer positive activities during the pandemic compared to students with-

out disability, F (1, 1070)=4.06, p<.05, partial eta^2=0.004. Students with a mental health disorder or learning problem were not distinguished from students without disability on the coping variables.

We observed no interaction effect of Disability status X Gender, Region, or Financial hardship on the stress or coping variables. In other words, the effects of disability on perceived stress and coping during the first pandemic wave were the same for boys and girls, students across the three different regions, and students who had received a loan or bursary (or not). However, we found an interaction effect of Disability status X Study program on perceived challenge, F (1,1255)=5.46, p<.05, partial eta^2=0.004. Among the students without disability, those enrolled in a biological technologies program viewed the pandemic more as a positive challenge compared to students in other study programs (M_{bt}= 3.21 vs. M_{others} = 2.87), with the inverse comparison for students with disability (M_{bt} = 2.64 vs. M_{others} = 2.80). A finer analysis (ANCOVA) as a function of disability type (see Fig. 2) shows that this inverse association for students in biological technologies holds true for students with a mental health disorder (M_{bt} = 2.59 vs. M_{others} = 2.84; F (1,1007)=5.88, p<.02, partial eta^2=0.006) or a learning problem (M_{bt} = 2.47 vs. M_{others} = 2.85; F (1,850)=4.16, p<.05, partial eta^2=0.005), but not for students with ADHD (M_{bt} = 2.92 vs. M_{others} = 2.85). In other words, students enrolled in a biological technologies program and having a mental health disorder or learning problem were less inclined to perceive the pandemic as a positive challenge in their life that could make them a better person.

Direct Effects of Personal and Contextual Factors

We found several direct effects of these factors after controlling for the three covariables. Girls felt more stress than boys (see Fig. 3): they reported more negative feelings and perceived more strongly that they had sacrificed parts of their life, F (1,1330)=10.36, p<.001, partial eta^2=0.008. They were also more worried about the pandemic making changes in their lives and disrupting their lives, F (1,1337)=37.69, p<.0001, partial eta^2=0.027. On the other hand, girls used information quest to manage their stress more than boys did, F (1,1345)=7.90, p<.005, partial eta^2=0.006, whereas boys engaged more in negative activities (alcohol and drugs, gaming), F (1,1297)=48.58, p<.0001, partial eta^2=0.036, as well as denial, F (1,1337)=18.45, p<.0001, partial eta^2=0.014.

Perceived stress also varied by study region (see Fig. 4). Students attending a college on the Island of Montreal or in Québec City said they were more threatened by the pan-

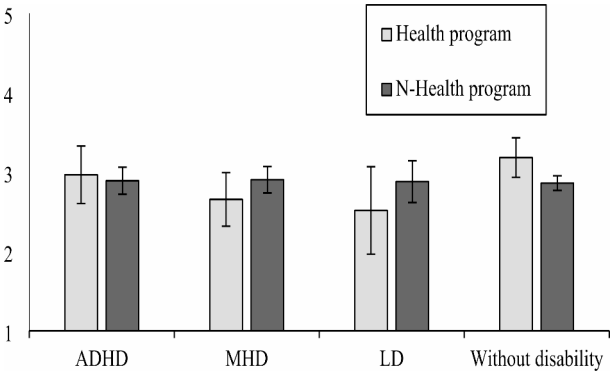

Fig. 2 Perceptions of challenge as a function of disability status and study program in college

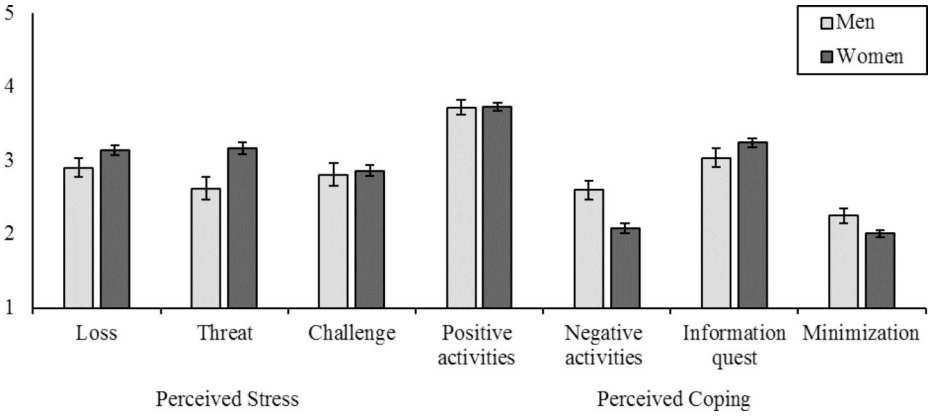

Fig. 3 Perceived stress and coping as a function of gender

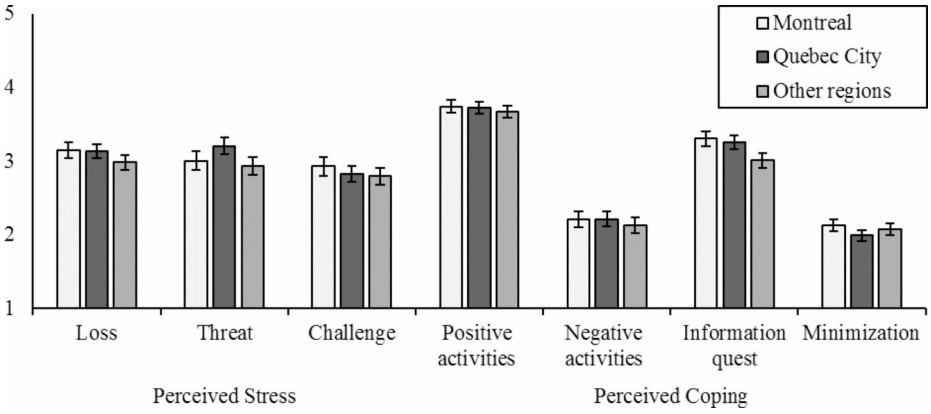

Fig. 4 Perceived stress and coping as a function of the region of the Quebec province

demic, F (2,1353)=5.41, p<.005, partial eta^2=0.008, and had stronger feelings of loss, F (2,1346)=3.31, p<.05, partial eta^2=0.005, compared to students attending a college in central Québec. Montreal and Québec City students also used information quest to manage their stress more than central Québec students did, F (2,1361)=9.82, p<.001, partial eta^2=0.014. Finally, Montreal students used more denial strategies compared to students in the other two regions, F (2,1353)=3.05, p<.05, partial eta^2=0.004.

Discussion

The first goal of this study was to draw a portrait of how college students experienced the first wave of the COVID-19 pandemic. We focused on participants' direct and indirect exposure to the disease and their subjective appraisals of the experience (Lazarus & Folkman, 1984). First, the descriptive data suggest a generally low-risk of exposure for the whole sample from March to June 2020, which is consistent with the national data for the Québec

province (INSPQ, 2022). One exception is the case of students with mental health disorders: significantly more had symptoms and got tested, although their positivity rate did not exceed that for students without disability.

This could be explained by various factors. First, it is possible that the pandemic exacerbated the anxiety of students who were coping with mental health problems, possibly leading them to overestimate the symptoms and effects of COVID-19. Given that cognitive and anticipatory rumination are integral components of the profiles of youth with mental health disorders (APA DSM-5, 2013), the pandemic would most probably have intensified these cognitive reactions, and particularly worries about physical health (Son et al., 2020; Wang & Goodman, 2022). It is also possible that students with mental health problems were more inclined to seek public health services for any health problems, and more of them would want to get tested for symptoms not necessarily related to COVID-19. Thus, the desire to get tested could be an indication of general anxiety and concern. It is also possible that the messages and measures by public health and colleges meant to mobilize vulnerable populations to get tested and vaccinated bore fruit. In the first wave, these institutions quickly rolled out preventive measures aimed at youth, and notably youth with mental problems. For example, the Québec government launched an unprecedented media campaign featuring a diversity of teenagers and young adults on television and social networks, with the active participation of community organizations (Gouvernement du Québec, 2020). These initiatives could have motivated more vulnerable youth to get tested.

Another noteworthy result is related to direct COVID-19 exposure. Twice as many students enrolled in biological technologies programs got tested compared to students in other programs. We are reminded that the first pandemic wave was marked by an alarming surge of infections in long-term health care centers for the elderly, with disproportionate numbers of deaths. This rapidly revealed vulnerability spurred governments to mobilize and recruit additional staff, including college students enrolled in biological technologies programs. Hence, it is no surprise that many more of these students got tested than students in other college programs. In fact, testing was mandatory for such workers, whether symptomatic or not. Another possibility is that the biological technologies students were more aware of the need for testing. COVID-19 became a subject in many health care courses, and instructors of biological technologies seized the opportunity to reinforce the need for compliance with the government's sanitary measures.

Although direct exposure to COVID-19 was relatively marginal in our sample, the descriptive analysis indicates that, from March to June 2020, almost one in five of the students knew someone in their social network who had tested positive. Still higher proportions were found for students attending a college in Montreal (25%) and students enrolled in a biological technologies program (30%). These proportions will probably rise during subsequent pandemic waves. Moreover, indirect exposure could become the norm rather than the exception. Furthermore, knowing someone who has been infected with the virus could constitute the first "intimate and concrete" experience of the pandemic. This experience could raise awareness in some students and hence reinforce positive sanitation attitudes and behaviors (Nofal et al., 2020). On the other hand, this experience could act to intensify fear, stress, and anxiety in other students if they feel that their physical health or economic situation is threatened by quarantine, confinement, and testing requirements (Horesh & Brown, 2020). Our results suggest that, along with targeted interventions, universal preventive measures that apply to all higher education students are needed. These measures should convey

messages that are positive, persuasive, and relevant. Communication strategies should present the facts and statistics in a manner that allows youth to buy into them and to trust the messengers, including the government, professors, influencers, and spokespersons. They should account for youth's perceptions of the risks, desirable social norms, and community resilience. The hope is to encourage young adults to adopt and maintain safe public health habits and to alleviate their anxiety and stress (INSPQ, 2020).

One finding of this study is intriguing. We showed that more students with learning problems than students without disabilities knew someone in their social network who had COVID-19 symptoms. This could be explained by certain intermediate variables that we could not integrate into this study. For instances, studies on the correlates of learning disabilities show greater prevalence of children with this diagnosis in disadvantaged environments and in certain racial and ethnic groups (e.g., American Indian; Alaskan Native) (see Shifrer et al., 2011). Meanwhile, epidemiological studies conducted during the first wave strongly suggest that COVID-19 cases were inequitably distributed in the population. The risks for catching the disease and having severe symptoms were higher in disadvantaged than advantaged environments (Wachtler et al., 2020). It is therefore possible that the relationship found in our study between learning problems and knowing someone who had COVID-19 was mediated by socioeconomic factors. This points to the need for preventive interventions that target disadvantaged settings.

Beyond direct and indirect exposure to COVID-19, the descriptive analysis results show that high proportions of students feared that the pandemic would impact their lives. The majority reported that they had dropped several meaningful activities during the first wave, and almost 40% were worried about their future. Furthermore, almost one-quarter had negative feelings such as guilt, sadness, and anger. Although the majority of the sample engaged in positive activities at the start of the first wave, a significant proportion of these increased their online gaming time (38%) and drug and alcohol consumption (12%).

This adjustment profile is worrisome. Higher anxiety about the future, negative feelings, and risky behaviors make up a cocktail that could produce internalized and externalized problems. Eventual outcomes could include mental health disorders and self-destructive behaviors (Watkins & Roberts, 2020). We must not underestimate the potential consequences of the COVID-19-related measures imposed by the government, colleges, professors, and families for the psychological health of young adults. In light of Lazarus and Folkman's (1984) transactional stress model, major changes and measures that are unpredictable and poorly understood may threaten students' egos. This could lessen their feelings of autonomy and empowerment, setting off a cascade of stress that would ultimately affect their mental health (Satici et al., 2020). To help avoid this, the authorities must send clear and simple messages of safety, hope, and management.

The second goal of this study was to determine whether perceptions of self and coping during the first wave of the pandemic would vary according to disability type after controlling for academic performance measured before pandemic onset. This methodological feature is particularly relevant because the majority of investigations of COVID-19 in young adults have not controlled for pre-pandemic adjustment (e.g., Haesebaert et al., 2020; Aristovnik et al., 2020). It is therefore unknown whether the risk factors identified in these studies are specific to the pandemic or to prior adjustment problems. Our results clearly indicate that disability status is associated with perceived stress during the first wave of the pandemic after controlling for pre-pandemic adjustment problems. Thus, students with a

mental health disorder reported higher stress levels. They perceived the pandemic as more threatening and felt that they had lost more from their lives compared to students without disability. Furthermore, disability type was associated with one coping dimension: compared to students without disability, students with ADHD reported doing fewer positive activities during the pandemic.

These results underscore the pandemic's potential impact on youth with pre-existing mental health problems (e.g., anxiety disorder, depression, autism spectrum disorder). The good news is that students with ADHD or learning problems did not appear to experience more stress during the first wave compared to students without disability. Nevertheless, we should keep in mind the high comorbidity rate in our sample: 37% of the students with disability disclosed the presence of more than one disorder at college entry. In our sample, the comorbidities were mostly anxiety disorder and ADHD, indicating that a relatively large proportion of students with ADHD and anxiety disorder experienced greater stress than students without disability.

These findings call for colleges to pay particular attention to the post-pandemic pathways of students who present mental health disorders. It is possible that the stress entailed from the first wave along with the rapid transition to remote learning delivery would fade over the second year of studies. It is also possible that the stress would increase with the arrival of subsequent waves, leading to dropout, failure, and disengagement. It is therefore important for colleges to implement follow-up and support measures to prevent stress from escalating in this population. Preventive strategies could include online professional services and mentoring, regular "sunshine calls"[6] to individual students, and peer assistance.

Our examination of the interactions between contextual factors and disability status produced an especially noteworthy result. Of the students who disclosed a mental health or learning issue, those who enrolled in a biological technologies program were less apt than students in other programs to think that the pandemic would make them a better person or to view it as a positive life challenge. In contrast, for the students without disability, those enrolled in a biological technologies program were more apt to view the pandemic as a positive life challenge compared to students in other programs.

This suggests that for the students in an applied health program, the effects of the pandemic were diametrically opposed depending on whether or not they were coping with a disability (i.e., those with mental health and/or learning problems). Thus, the pandemic seems to have motivated students without disability and demotivated students with disability. This highlights the importance of how individuals perceive the challenges of potentially stressful events. When these perceptions produce positive thoughts, they strengthen students' resilient qualities (Vinkers et al., 2020). However, when students perceive that they will be unable to handle the professional challenges of their program, they may make poor academic choices or abandon their studies. These findings suggest that the rates for program changes and dropout could be particularly high among students with disability in applied health programs, especially those struggling with a mental health or learning disorder.

The analysis of gender suggests that girls had higher stress levels than boys during the first pandemic wave, but that they dealt with it more constructively. Although they reported more negative feelings and fears about the pandemic, they showed more initiative in learning about it, spent less time on negative activities, and were less inclined to downplay the situation.

[6] A telephone call to check on the well-being of individuals and reassure them.

Although this portrait departs somewhat from other studies of the effects of COVID-19 on youth (see, e.g., Wang & Goodman, 2022), it makes sense. For example, a study in young adults in France indicated that girls reported lower well-being during the first wave than boys did (Haesebaert et al., 2020). Another international study by Aristovnik and colleagues (2020) showed that, compared to girls, boys in postsecondary programs were less satisfied with their academic life during the pandemic. Taken together, these and our results suggest that girls were more affected by the first wave in terms of stress and well-being but managed to find more constructive ways to deal with it. We are reminded here that the boys in our sample, over and above their pre-pandemic adjustment, tended to downplay the impact of the pandemic more than girls did. They also spent more time on negative activities such as drug and alcohol consumption and/or online gaming. In some respects, therefore, boys would constitute an at-risk population.

The moderating analysis also showed that students in Montreal and Québec City (more urban regions) were more threatened by the pandemic, had stronger feelings of loss, and used more information quest to manage their stress than students in central Québec (more rural region). Furthermore, students in Montreal reported stronger use of denial to cope with the pandemic compared to students in other regions. Unlike Central Québec, Montreal and Québec City are densely populated urban centers (with significantly more residents in Montreal). Unsurprisingly, therefore, students in Montreal reported knowing more people who caught COVID-19. Consequently, the government of Québec imposed stricter lockdowns in these cities compared to non-urban areas. This could have contributed to greater perceptions of stress among the urban populations, resulting in more proactive and defensive reactions. Moreover, thanks to the crowded city conditions combined with social distancing measures, it is probable that the urban students were more stressed and more reactive. Furthermore, Montreal had the highest positivity rates during the first wave, which would have only added to the stress.

On the other hand, it is equally possible that these differences across the regions could be explained by differing college student profiles. In Montreal, many more students are immigrants or members of cultural minorities compared to other Québec regions, and social and economic inequalities are more evident in Montreal's colleges. Considering the inequal impacts of COVID-19 across populations of youth (Wachtler et al., 2020), it is possible that college students in Montreal experienced more stress and had more extreme reactions in the first wave compared to students in other regions.

Strengths and Limitations

To our knowledge, this is the first study to examine stress in college students with and without disability during the first wave of the COVID-19 pandemic while controlling for students' initial status (college adjustment; high school GPA) and degree of exposure. The results clearly show that the stress felt during the first wave was independent of student-reported problems prior to the pandemic. In addition, contrary to the pandemic research to date, our investigation into the effects of the pandemic integrated Lazarus and Folkman's (1984) transactional stress model. The results strongly suggest that students' subjective appraisals of the pandemic's impact should be considered in such investigations.

Our study also includes certain limitations that must be mentioned. First, we do not yet have objective data on the students' academic pathways. The ESH-Transition study will

continue up to the spring of 2022. After that, we will collect the data on academic pathways. Therefore, in the near future, we will be in a position to report the rates for course completion, program changes, perseverance, and graduation. This will allow determining the influence of stress related to the pandemic's first wave on students' academic pathways.

Second, we assessed pandemic-related stress with a questionnaire that was developed specifically for this study. The strength of the questionnaire lies in its excellent alignment with the premises of the transactional model of stress (Lazarus & Folkman, 1984). It also demonstrated commendable psychometric properties, with excellent factor structure and good internal consistency for the majority of dimensions. Nevertheless, it would be important to further validate this measure in future studies. We encourage researchers on the effects of the pandemic on postsecondary students to use this questionnaire and test its validity.

Third, we documented stress as perceived by college students during the first wave of the pandemic without measuring their perceptions of teaching quality and family experiences. On the one hand, the remote learning experience could have varied widely across students. For instance, some professors would have little trouble transitioning to this teaching mode and creating a positive learning environment. Meanwhile, others may have found the technology rather daunting. These professors may have delivered an online experience that was less reassuring and less conducive to learning. On the other hand, parents' support for their children's learning may have been affected by the COVID-19 pandemic as a function of working from home. For instance, studies have shown that responsive parenting decreased while harsh parenting increased during the first wave, but only among mothers who did not work from home (Bernhardt et al., 2022). This suggests that working at home during a pandemic can act as a protective factor against stress. Future studies on the pandemic's effects on students should consider a wide range of online teaching and family contexts.

Fourth, the measure of stress was based exclusively on self-reports. This raises the possibility that the symptoms were not estimated as accurately between students with and without disability. Thus, students with disability would assess their symptoms more carefully due to their precondition. Future studies should include multi-informant, multi-method assessments to capture pandemic-related stress effects on college adjustment.

Finally, although our sample is large, it does not adequately represent the North American population. For instance, the United States has a more diversified immigrant population, higher population density, and greater social and economic inequalities than Canada or Québec. The higher education system is also more diversified in the United States, and generally much more expensive. Although the COVID-19 pandemic was a natural disaster that randomly targeted its victims, the results of our study must be generalized to the North American population with caution.

Conclusion

The overall aim of this study was to describe the stress experienced by first-year college students with and without disability during the first wave of the COVID-19 pandemic. The results indicate a significant increase in stress according to initial disability status, and particularly for students with a mental health disorder. Moreover, significant differences were found between how girls and boys coped with stress, between students in central Québec

compared to Montreal and Québec City, and for students with disability enrolled in a biological technologies program. Future studies should integrate students' perceptions of remote learning modes to determine the effects of the pandemic on academic pathways, including rates of course completion, perseverance, and graduation.

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