

# SYSTEMS DESIGN ENGINEERING 2020 Class Profile

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Earvin Tio, Stephanie Carras, Tara Yuen

# INTRODUCTION

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Systems Design Engineering (SYDE) is a unique program at the University of Waterloo where students develop interdisciplinary engineering skills with a focus on human factors, mechatronics, and social environmental systems. Throughout the five-year degree, students complete eight academic semesters and six co-op terms. Due to the wide spanning applications of the degree, the 84 students within the 2020 cohort have developed a shared but unique experience throughout their time at Waterloo.

The class profile attempts to represent the perspectives of the cohort that was formed in the Fall of 2015 and completed their degree in the Spring of 2020. The analysis explores the class's demographics, academic and co-op experiences as well as providing insight into the lifestyle and future thoughts from the cohort. Given the unique timing of our graduation, an additional survey was conducted to reflect the experiences SYDE 2020 had while finishing their degree during the COVID-19 pandemic.

# ANALYST NOTES

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64 out of 84 students (76%) from the 2020 cohort are represented within this survey. All information presented is accurate up to the date of collection, May 6th, 2020. The results shown within this class profile do not extend beyond that of the SYDE 2020 cohort, or even to the portion of the class that chose not to provide data. The profile documents the experiences and perspectives of the 2020 class without attempting to make inferences about a larger population.

Within the analysis, academic terms are denoted as 1A, 1B, 2A, 2B etc. where the number denotes the year of study and the letter corresponds to the first or second term of that academic year. After completing the first academic term (1A) the cohort began their first of six co-op terms. For the remaining five years, the students alternated between school and work before completing a consecutive eight months of school for 4A and 4B.

Additionally, the p-value notation used throughout the profile is as follows:

ns: $5.00e-02 < p \leq 1.00e+00$		
*: $1.00e-02 < p \leq 5.00e-02$	***: $1.00e-04 < p \leq 1.00e-03$	
**: $1.00e-03 < p \leq 1.00e-02$	****: $p \leq 1.00e-04$	

It should be noted that this survey was conducted by students independent of the department, faculty, and university.







# OUTLINE

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DEMOGRAPHICS

ACADEMICS

CO-OP

LIFESTYLE

FUTURE

PANDEMIC



# DEMOGRAPHICS

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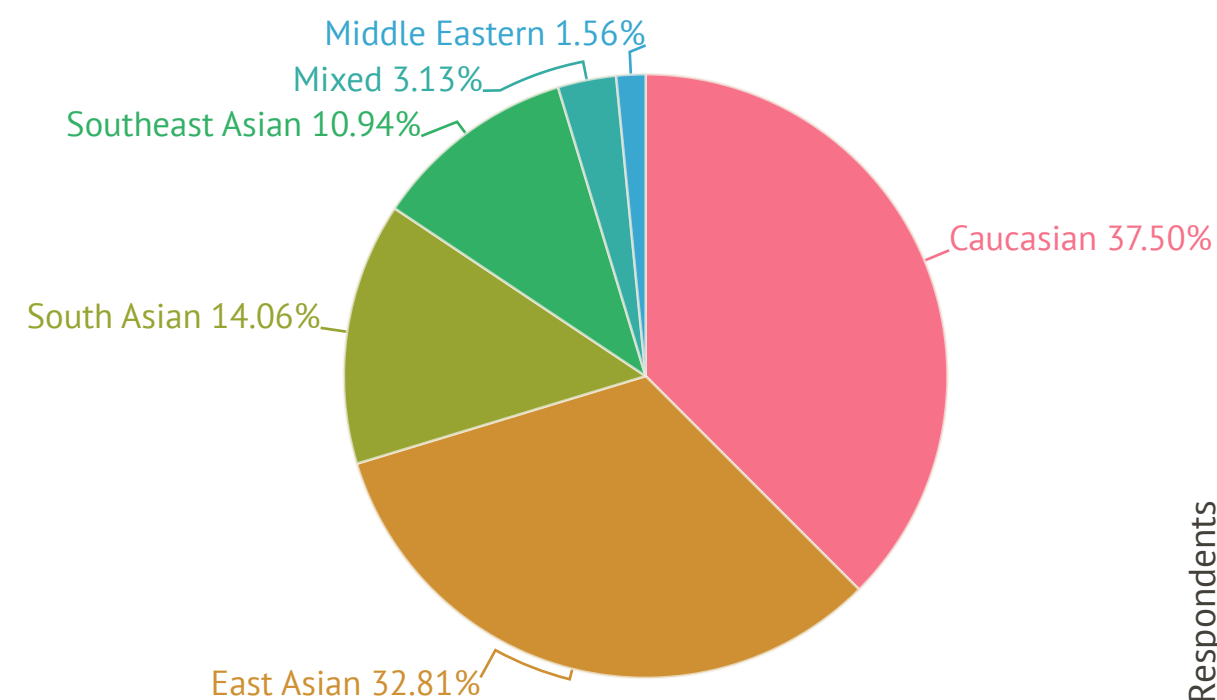
What does the SYDE 2020 cohort look like at a glance?



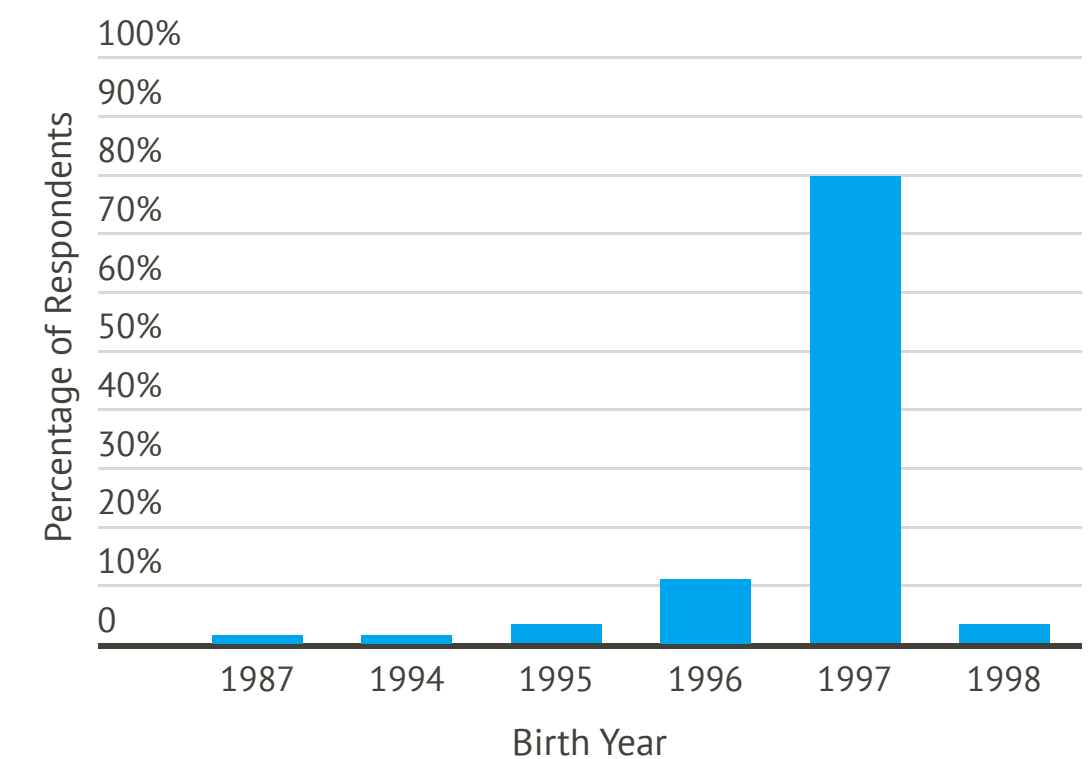
# GENDER, AGE, & ETHNICITY

Systems Design Engineering has always traditionally had a healthy gender ratio. This is seen in the 2020 cohort, where **38%** of students identify as female.

The majority of the class is comprised of Caucasians, males, and individuals born in 1997.



Female Male Prefer not to say

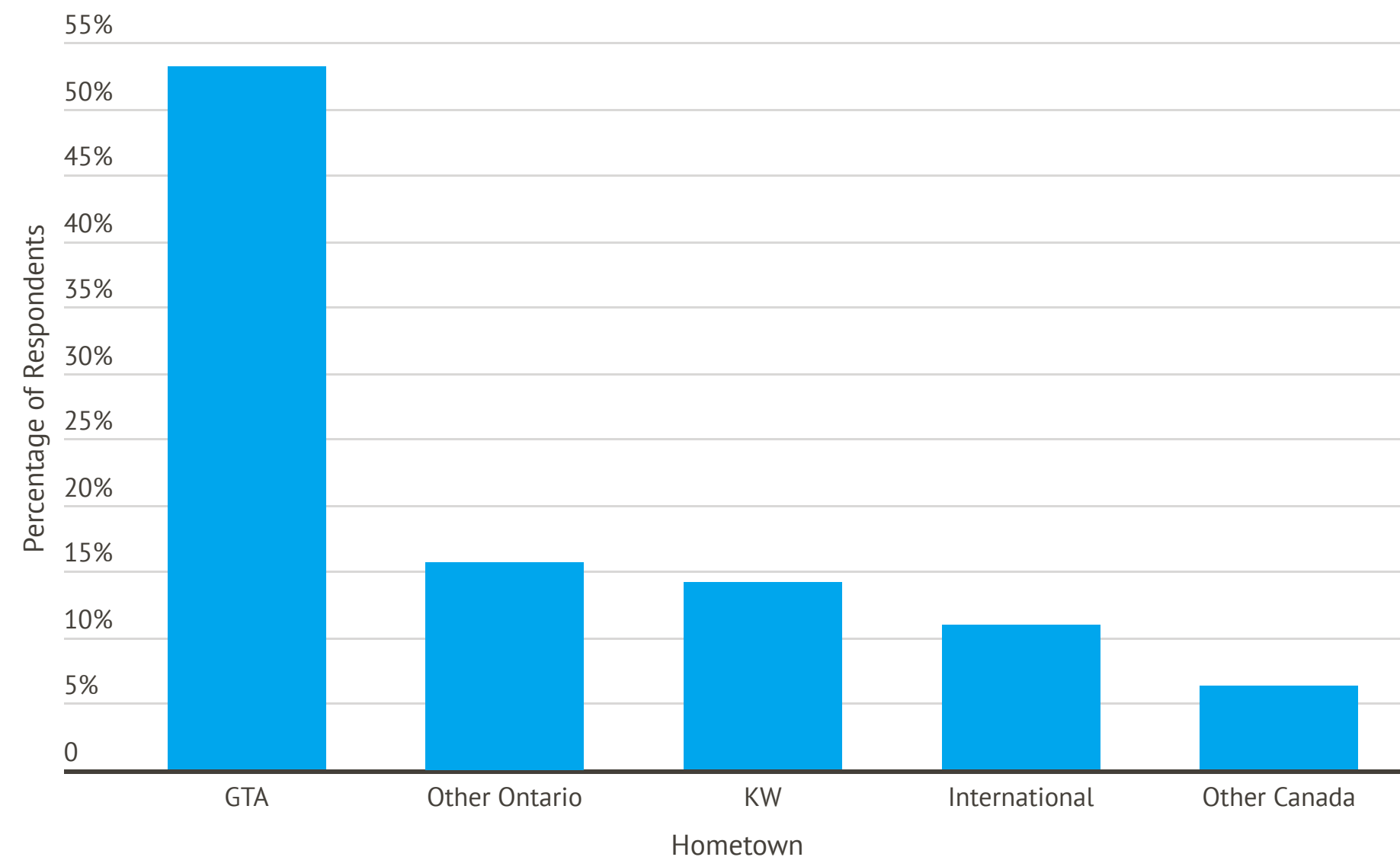




# HOMETOWN

The majority of students come from Ontario with **53%** from the Greater Toronto Area.

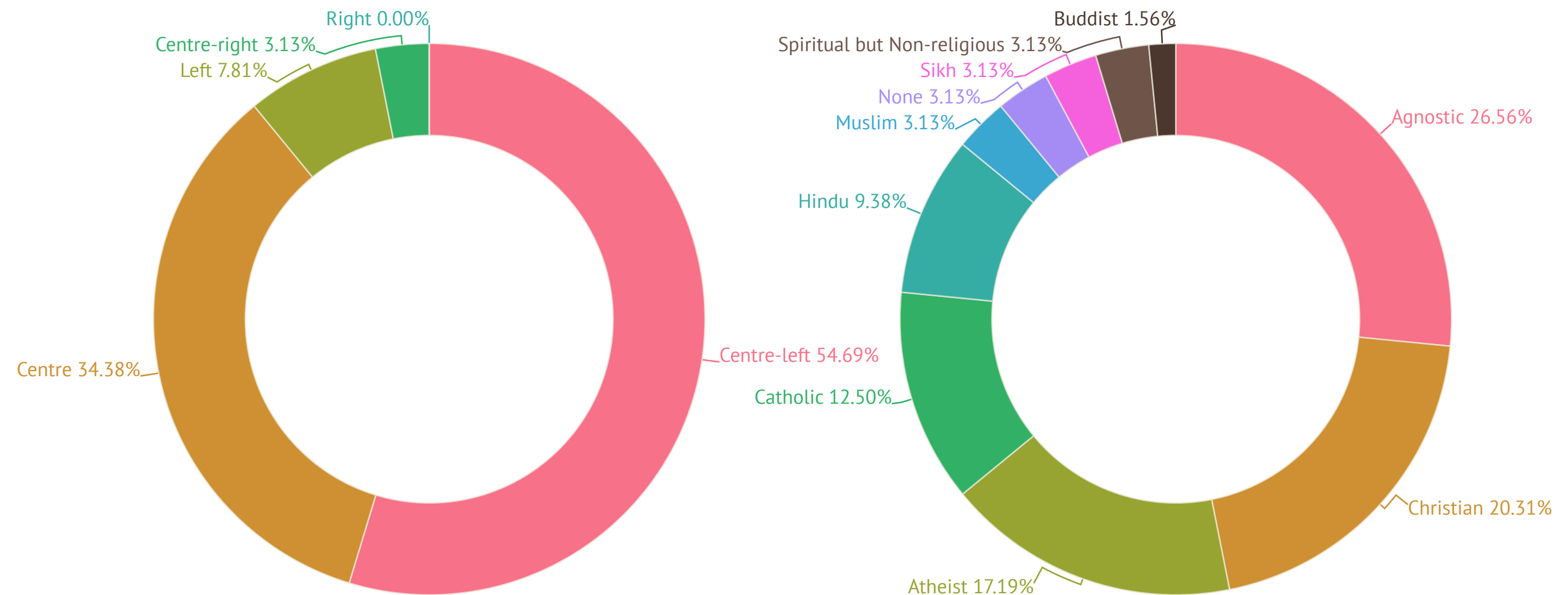
**11%** of the class are international students.





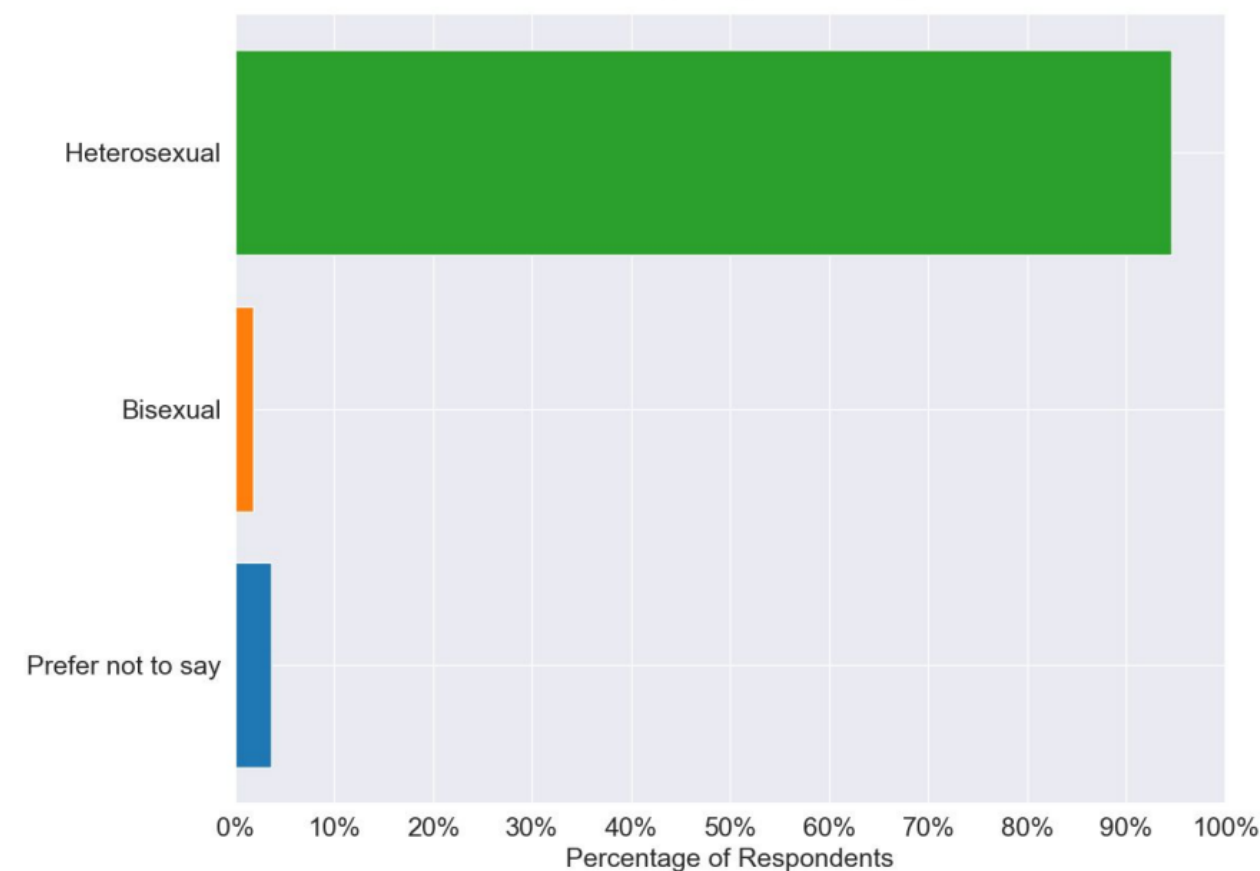
# POLITICAL VIEWS & RELIGIOUS BELIEFS

The class holds a range of political perspectives and a wide variety of religious beliefs, further supporting the diversity of the SYDE program.

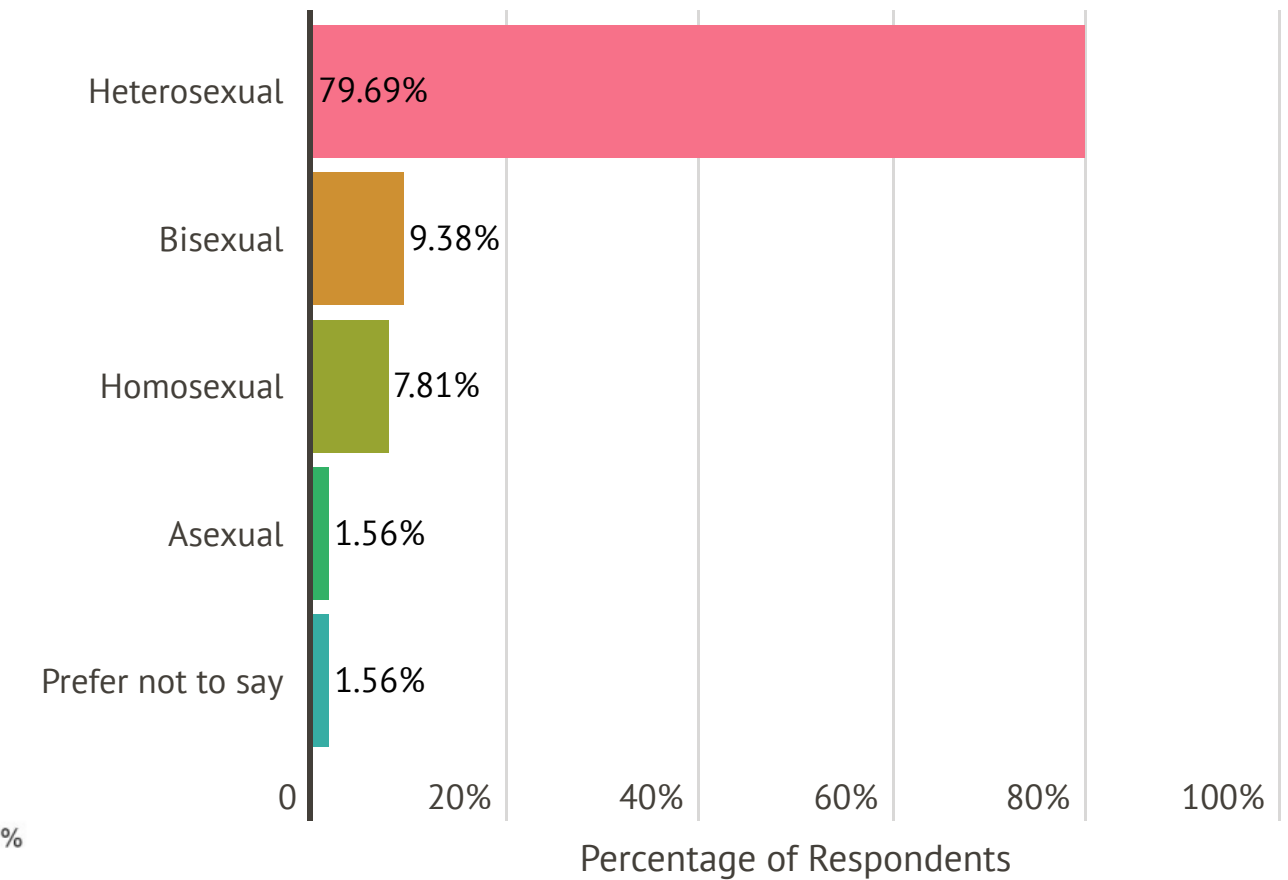


# SEXUAL ORIENTATION

Is the 2020 cohort more diverse?  
It would seem so - at least in  
terms of sexual orientation as  
compared to the 2019 cohort.



results from the 2019 survey

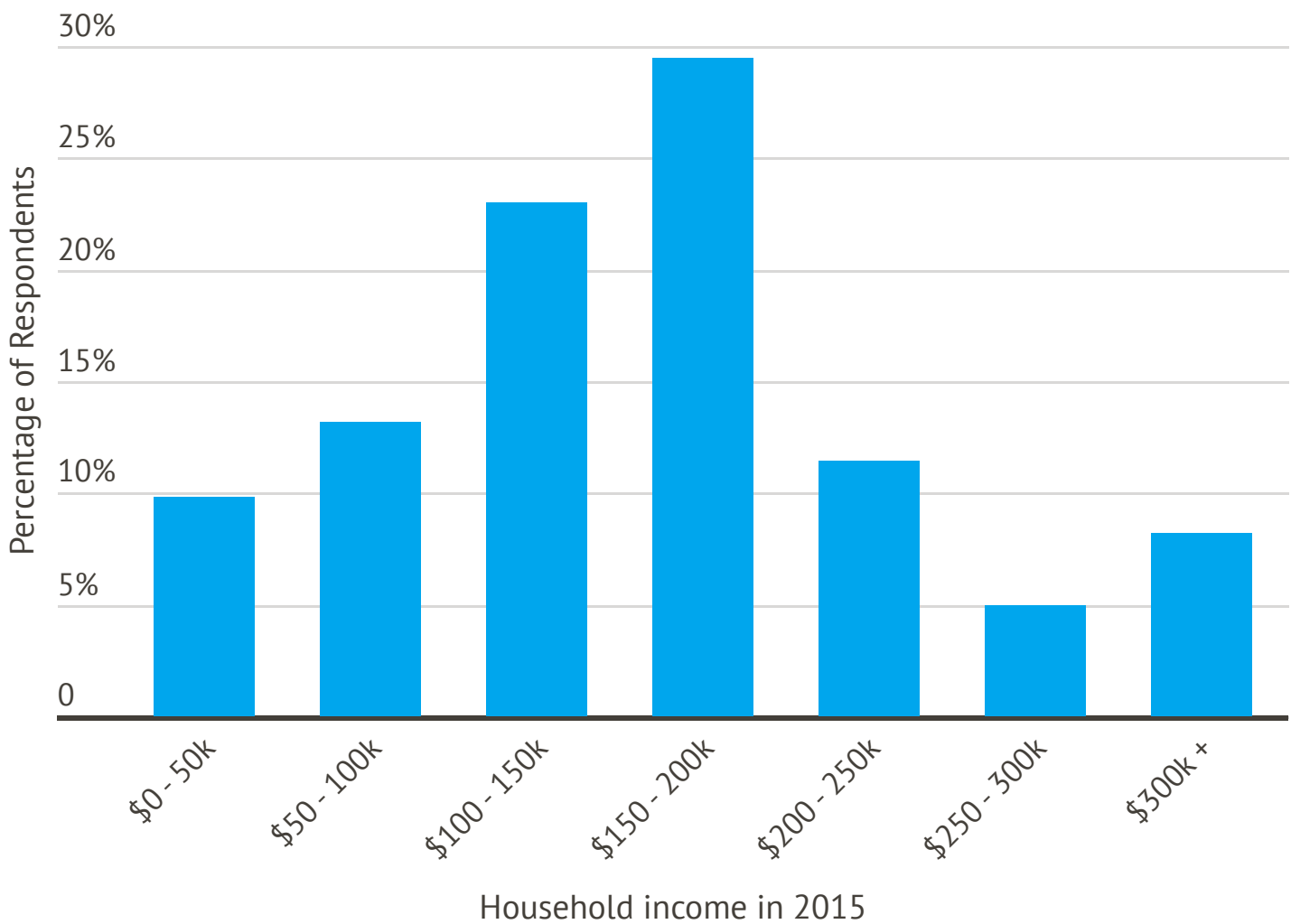
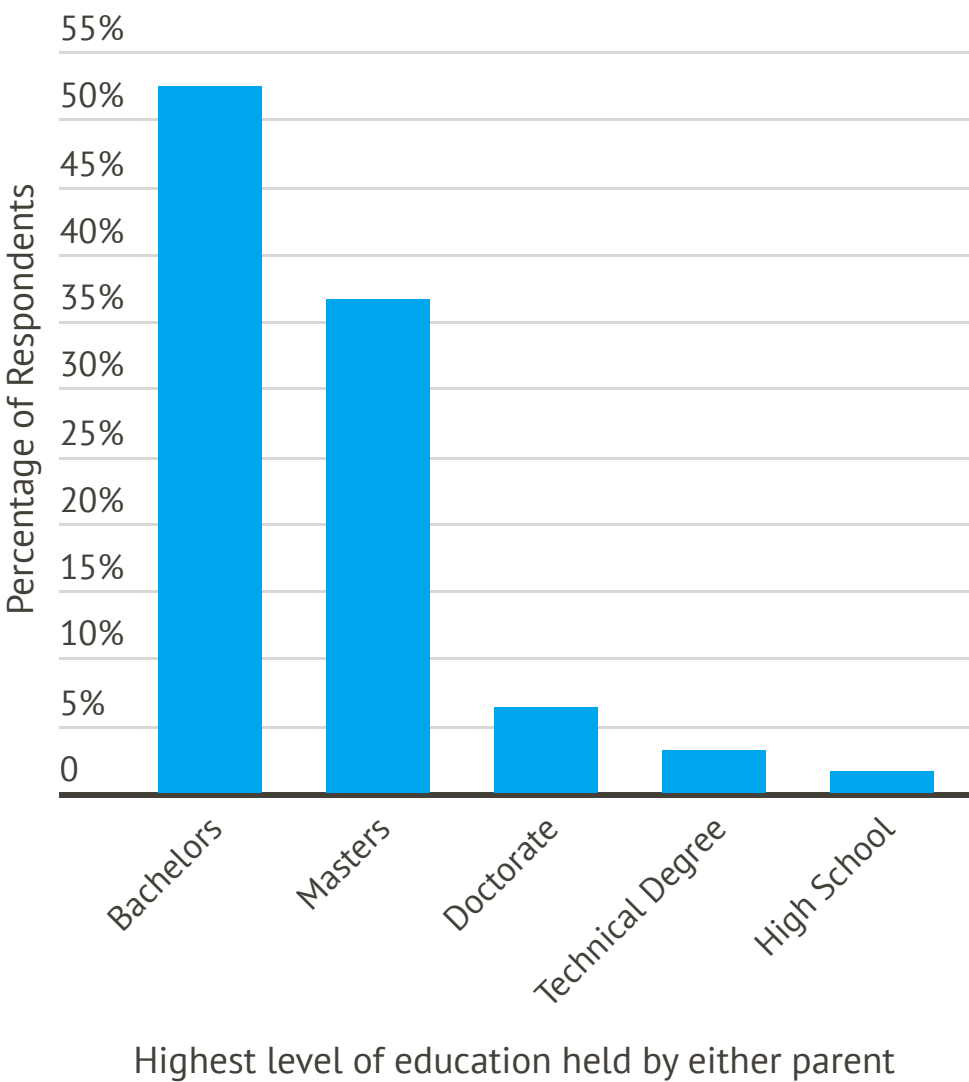


results from the 2020 survey



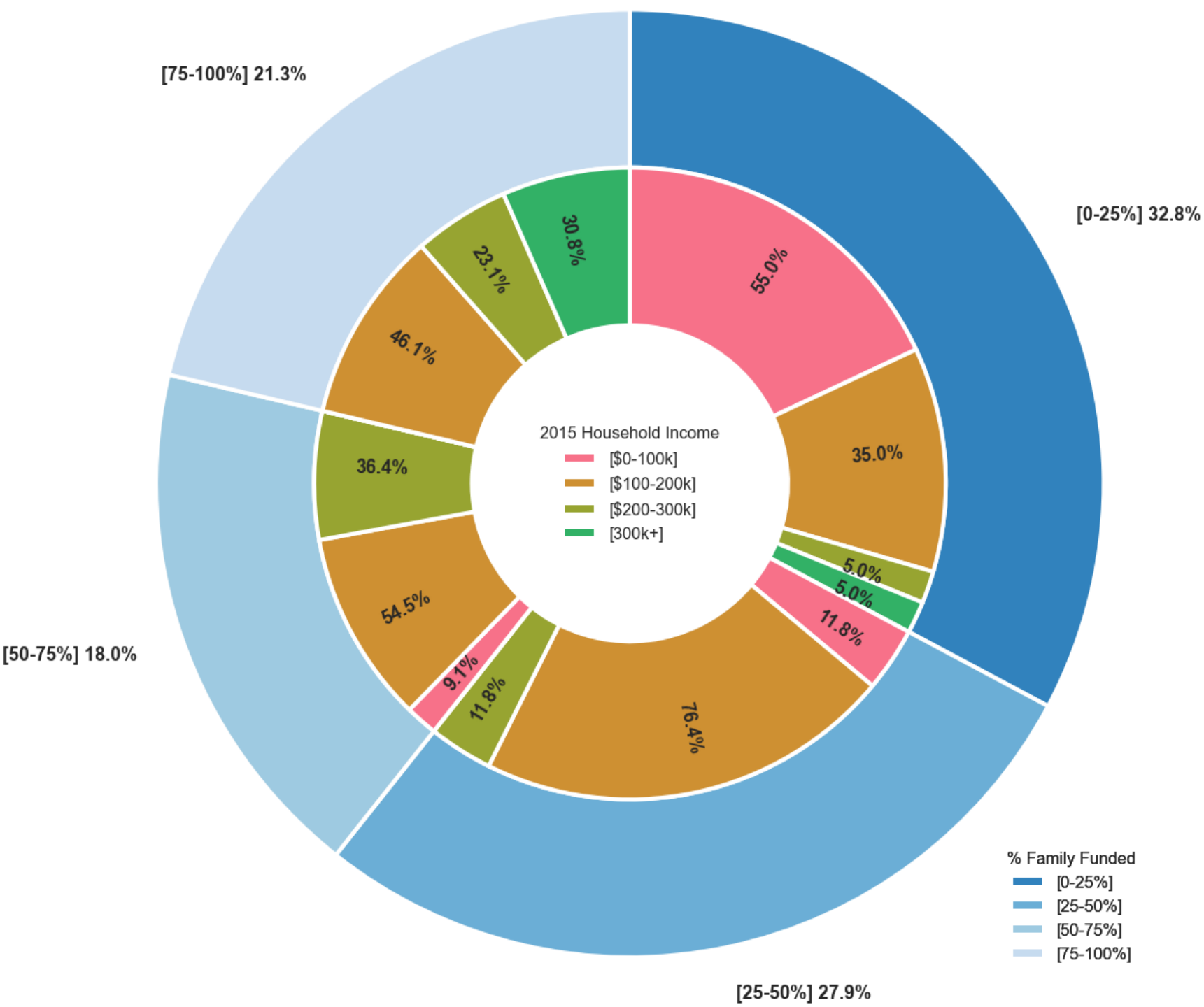
# FAMILY

Almost all students come from an upper-middle class and well-educated family.



# UNIVERSITY FUNDING

More than half of the class supported **50%** or more of their university expenses. It is also interesting to note that almost all students from lower-income families were self-funded, while students that came from families with a household income of over \$300k CAD were almost completely family-funded.





# ACADEMICS

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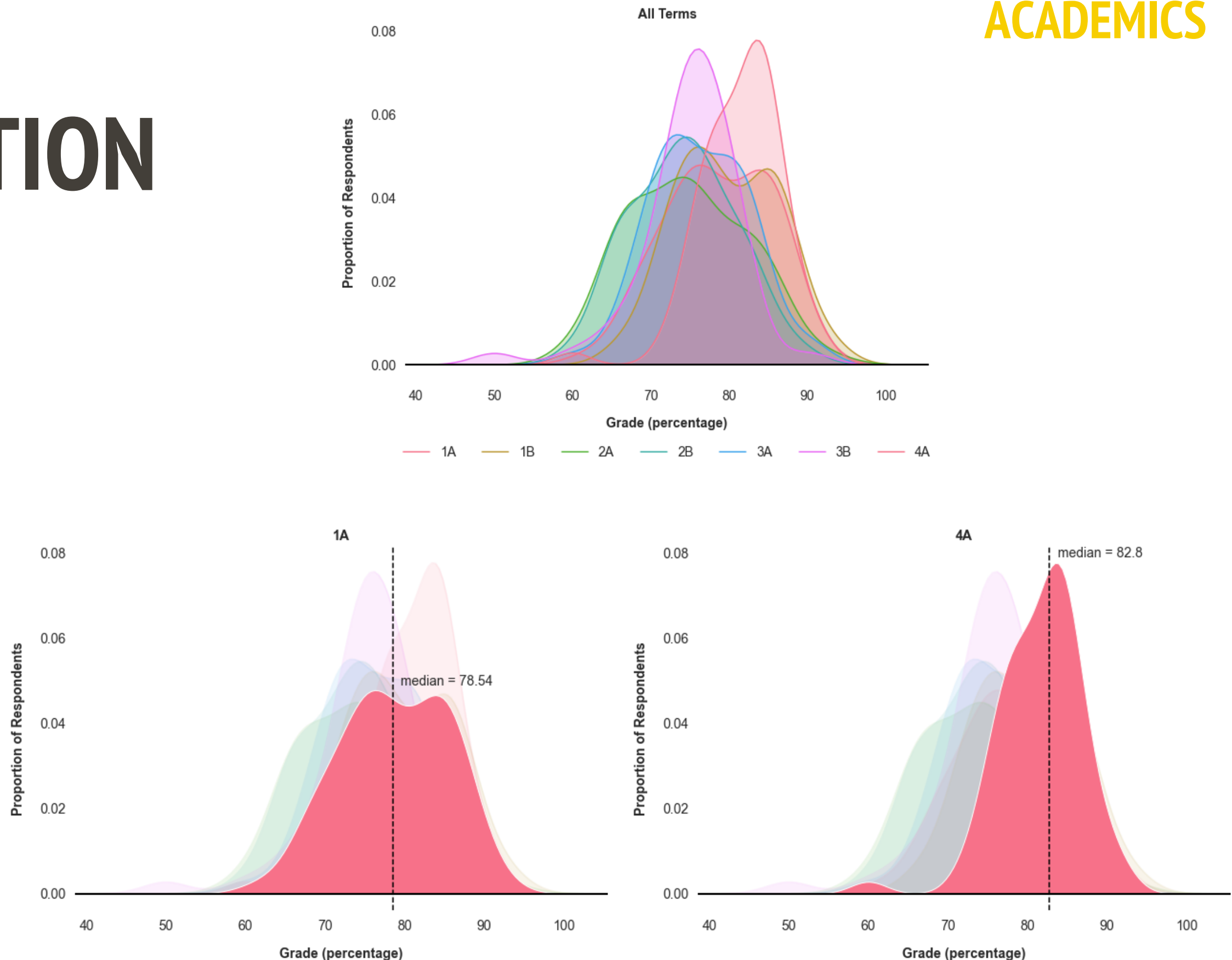
Are the rumours true? Are we as dumb as they think?

1/8

ACADEMICS

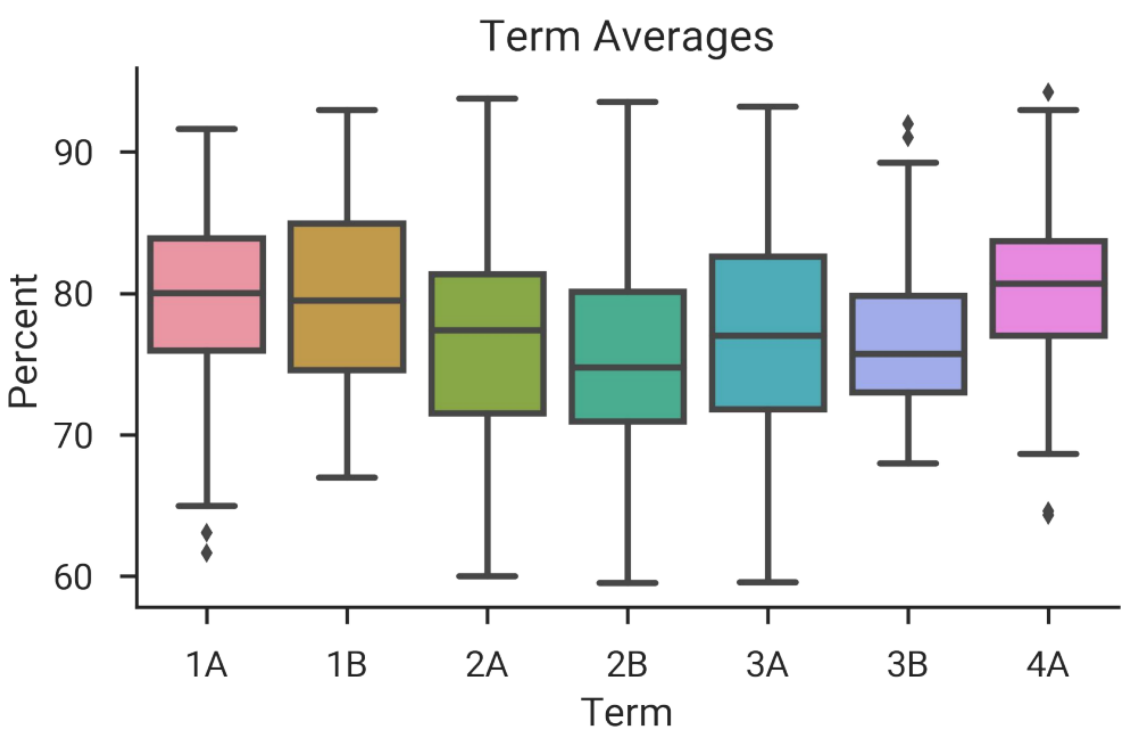
# GRADE DISTRIBUTION

There are many factors that could have contributed to the difference in grades between first and fourth year. In 1A, students may have struggled studying for their first university midterms while also applying for jobs. Whereas in fourth year, students were able to fill their schedules with courses that they were passionate about (or were "easier"), which was reflected in better academics performances.

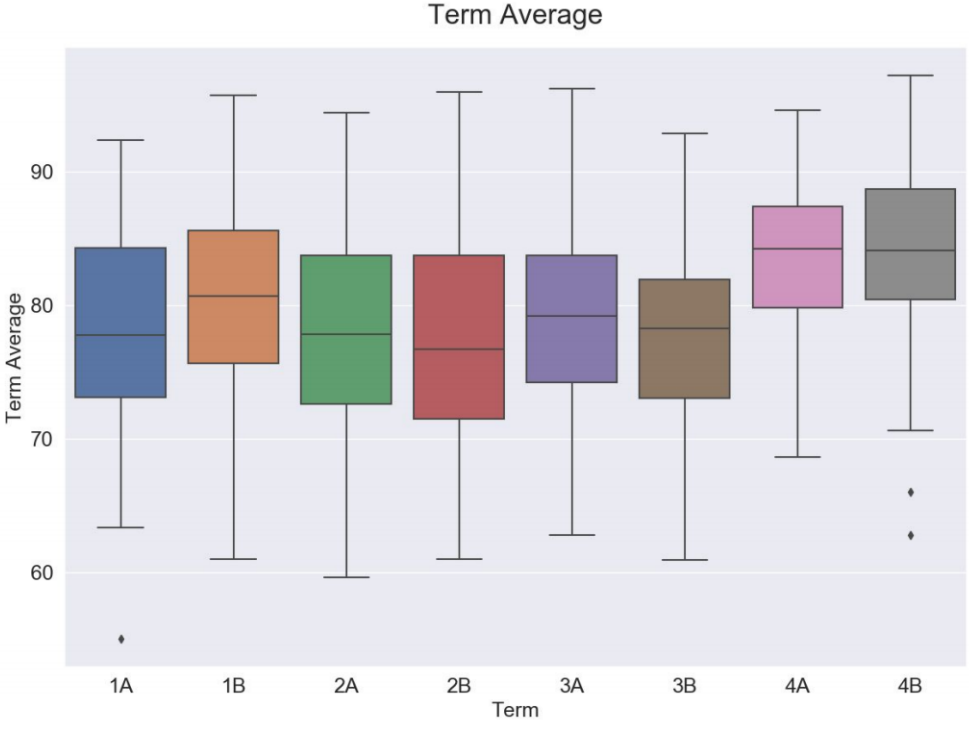




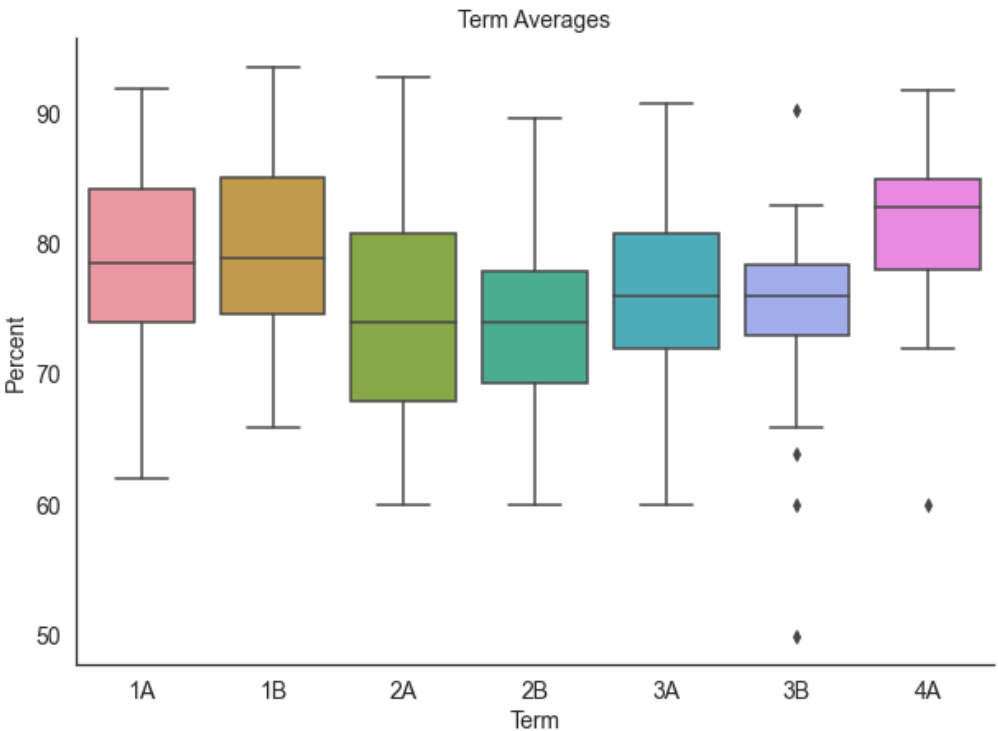
# GRADE COMPARISON



2018



2019

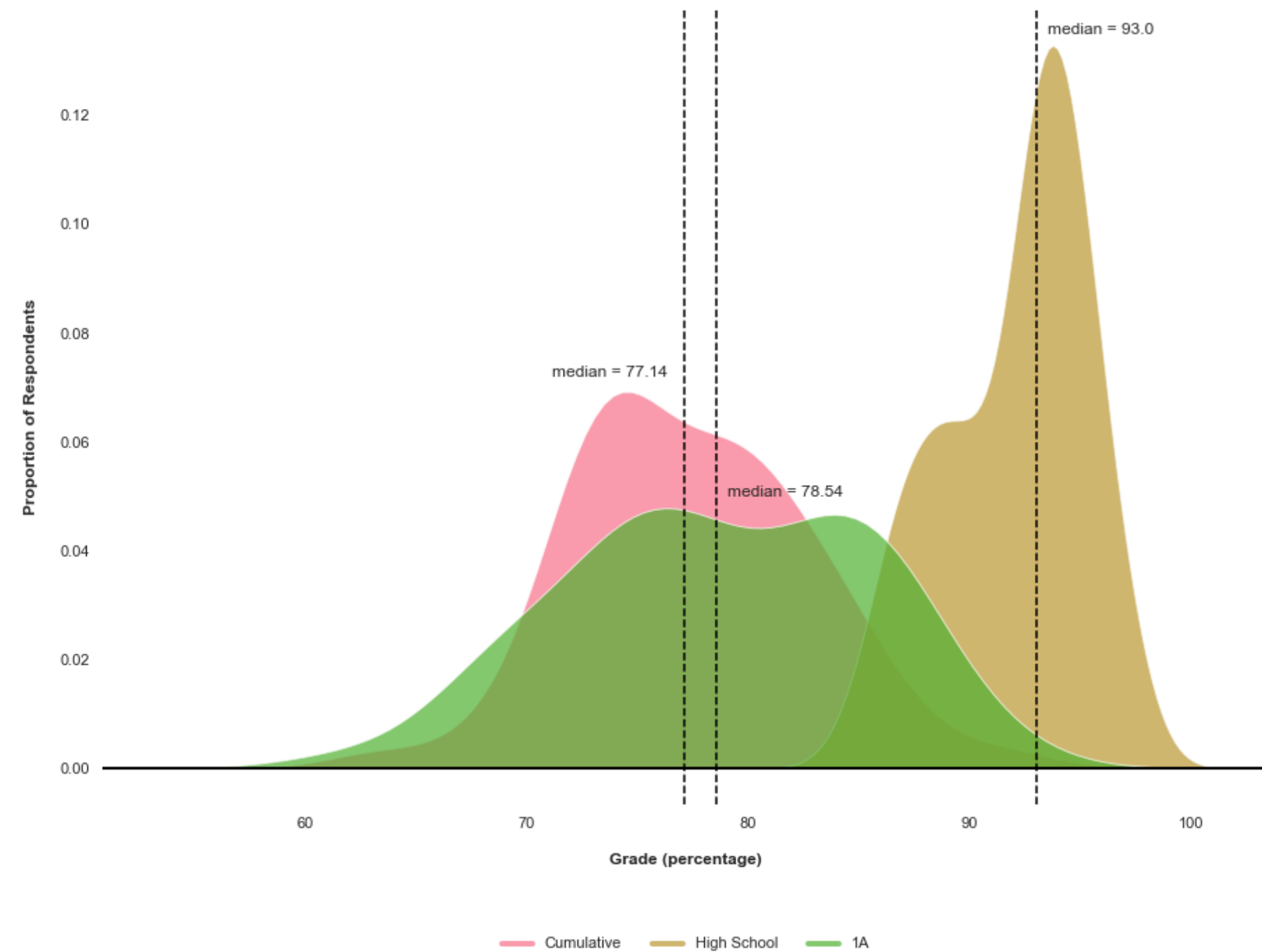


2020

By looking at previous class profile data it can be seen that SYDE cohorts have similar experiences academically across school terms.

# HIGH SCHOOL TRANSITION

Another factor this survey investigates is the correlation between high school and university performances. The median grade dropped **14%** from high school entrance averages to the first term in university.

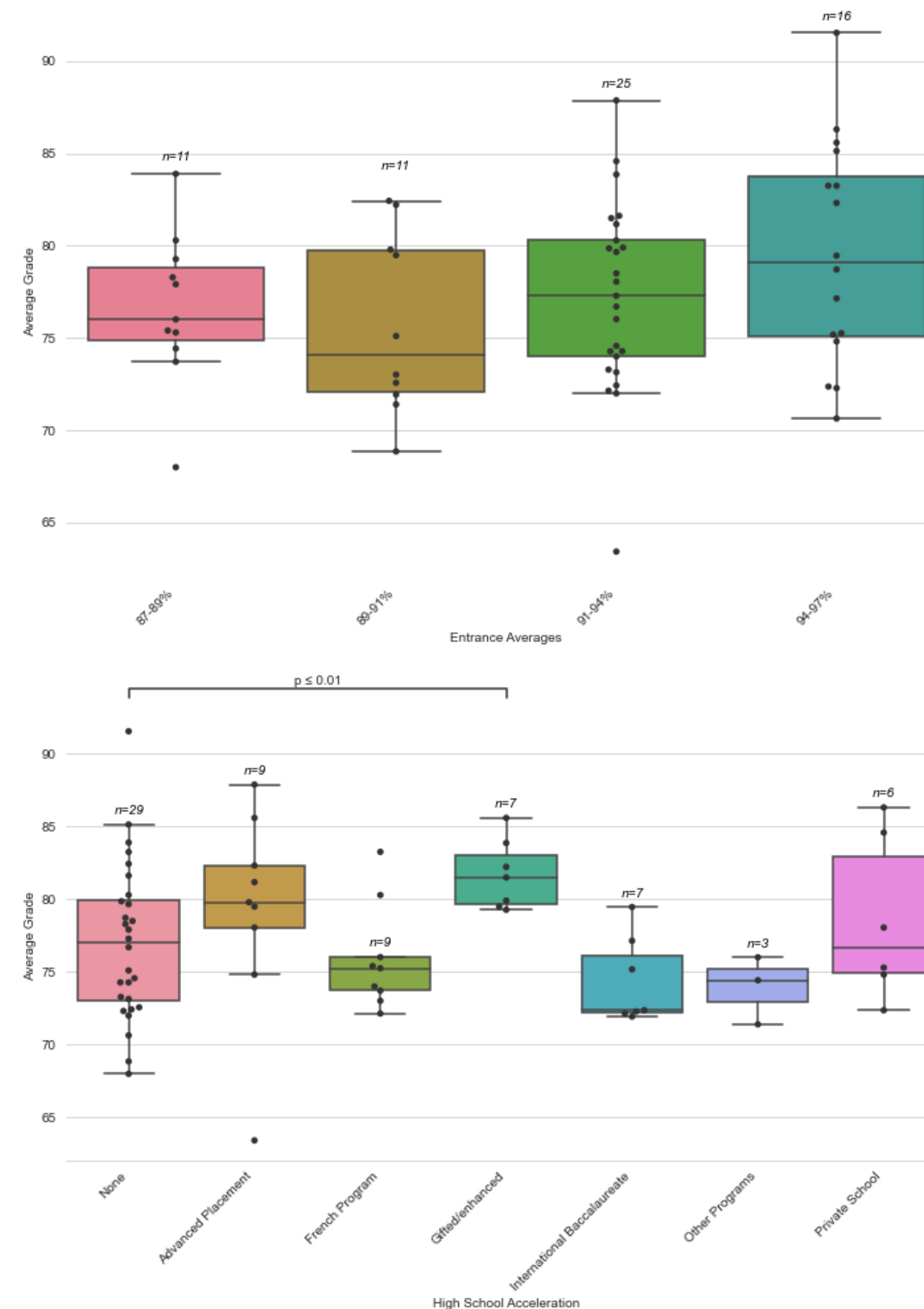


4/8

# HIGH SCHOOL

An investigation into whether high school factors, such as admittance averages and acceleration programs affect overall performance in university uncovers only one statistically significant difference in university grades; the average grades of students who attended a gifted (also known as enhanced) program in high school are statistically different from grades of students who attended a regular high school program.

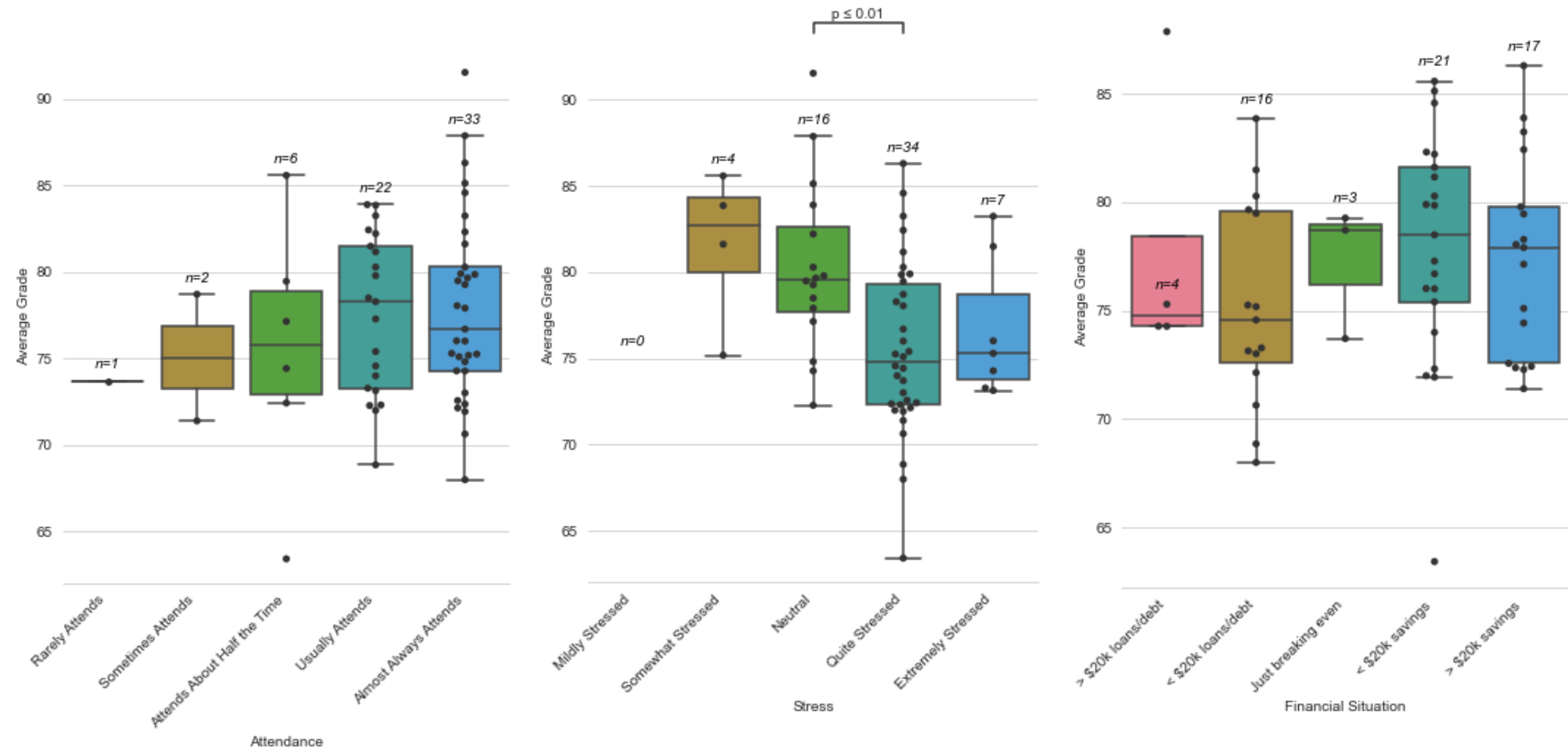
## ACADEMICS





# ATTENDANCE, STRESS, & FINANCE

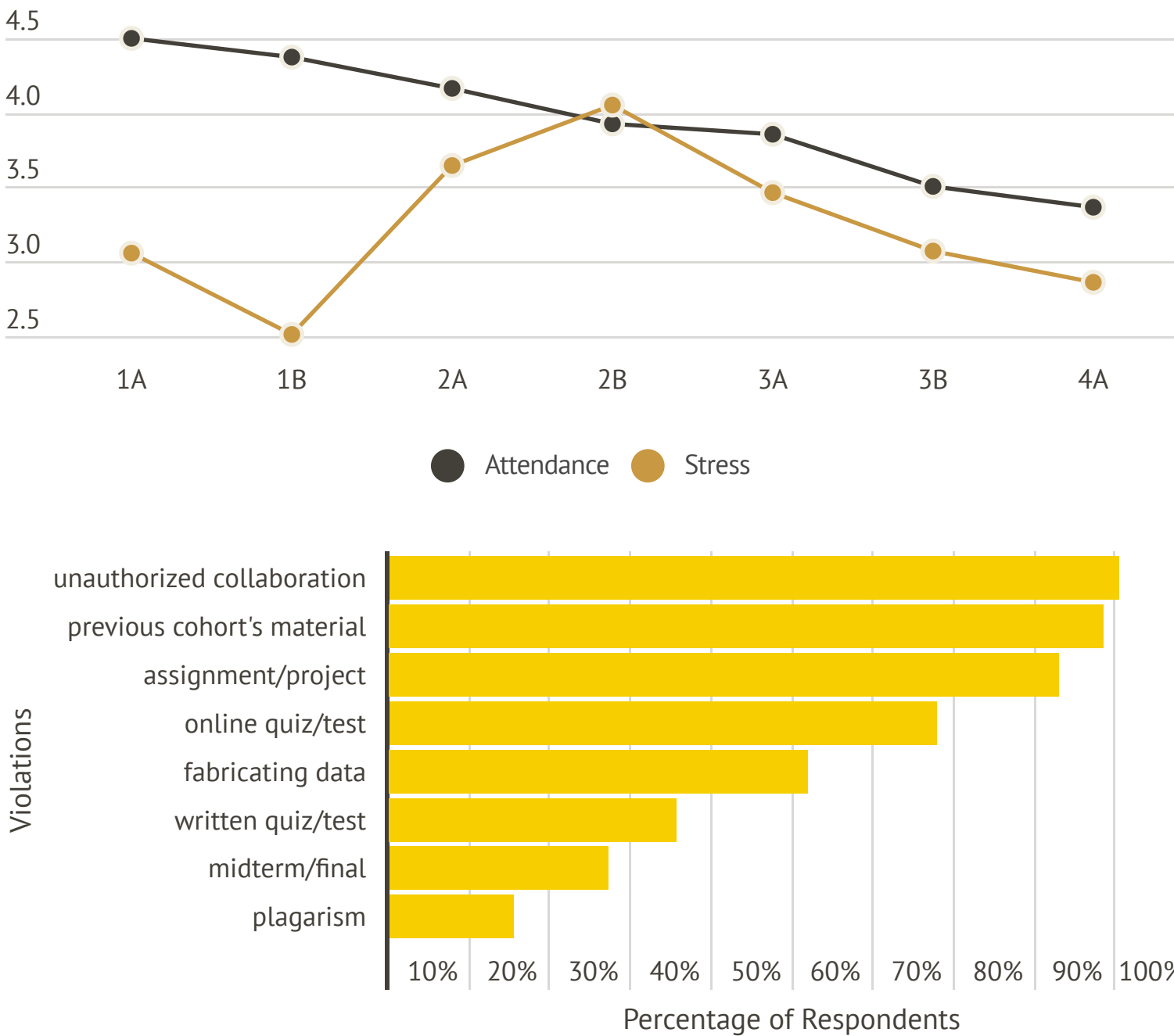
Additional investigations were conducted on the impact of attendance, stress, and finance on cumulative grades. The only insight gained was that students who reported being *neutral* in stress may perform better than those who reported as being *quite stressed*. However, overall, the three aspects investigated do not seem to have a large impact on grades.



# ATTENDANCE, STRESS, & INTEGRITY

Students were asked to rate their attendance levels from *never* to *almost always* and stress levels from one to ten. Attendance levels were then converted to numerical scales to compare against stress levels. It is interesting to note that stress levels varied across terms, but seem to have no effect on attendance rates, which consistently declined throughout the degree.

Also, **14%** of respondents claim to have never cheated, while the remaining reported violating one or more forms of academic integrity, broken down in the bar graph on the right.



# EXCHANGE

Going on an exchange semester played a big role in the SYDE 2020 journey.

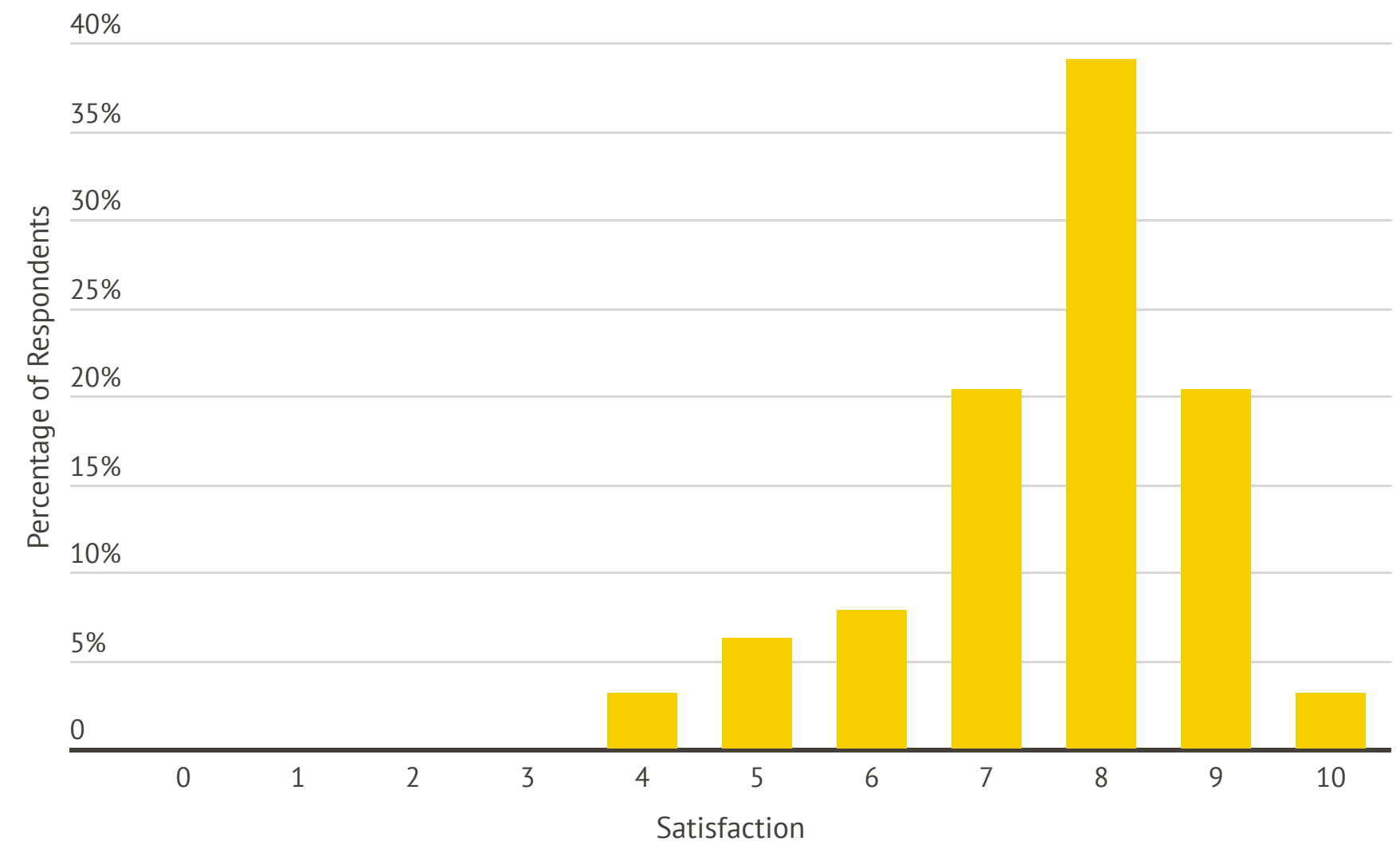
Increasingly strict conditions did not stop **18%** of the class from studying abroad in seven different countries.





# PROGRAM SATISFACTION

The class was asked, "*How satisfied were you with the SYDE program?*", with zero being *extremely dissatisfied* and ten being *extremely satisfied*. The responses show favourable sentiment towards the program, and **73%** of respondents indicated that they would choose SYDE again if they had to redo their undergraduate degree.



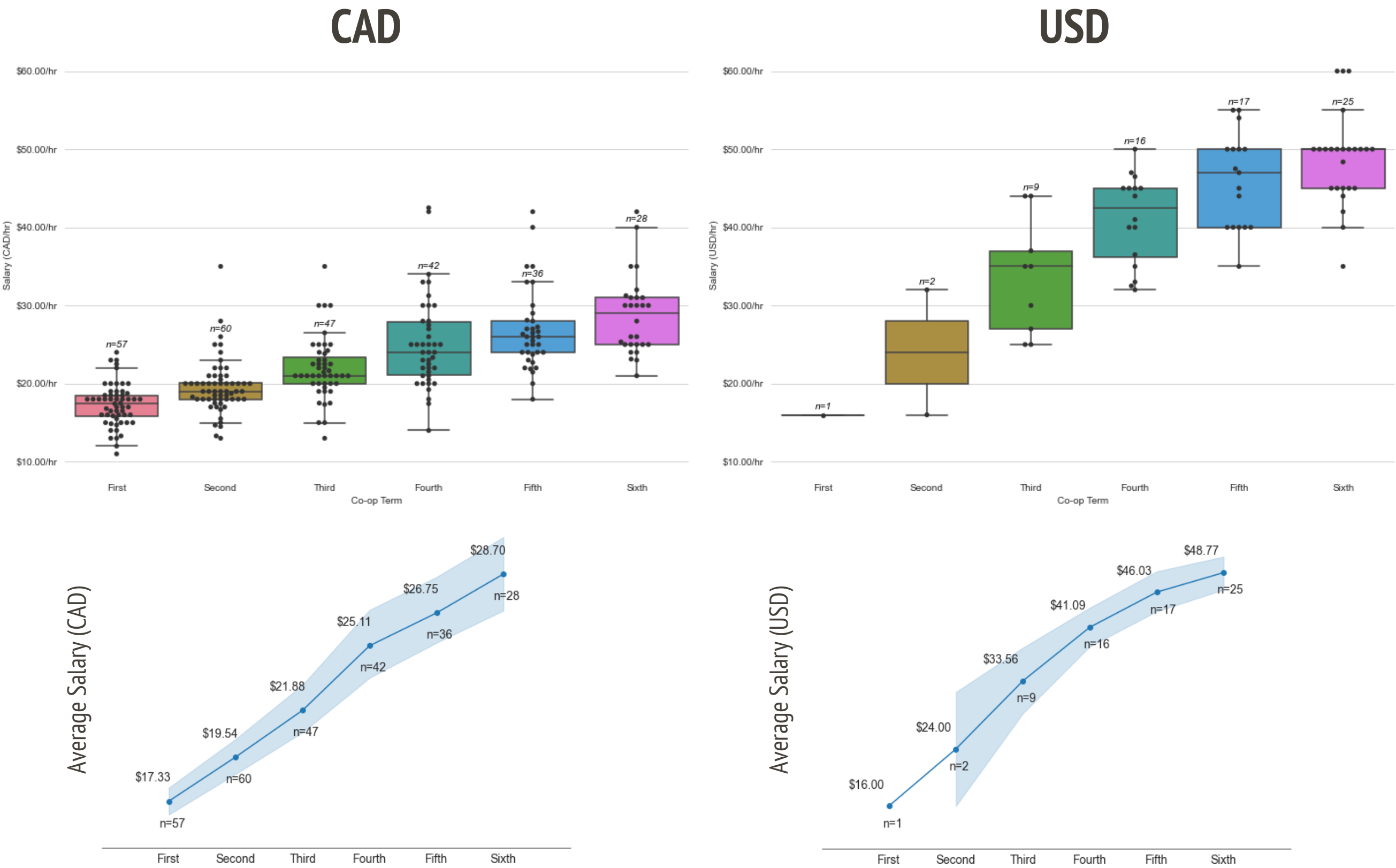
# CO-OP

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From a generalist perspective to a personalized experience.

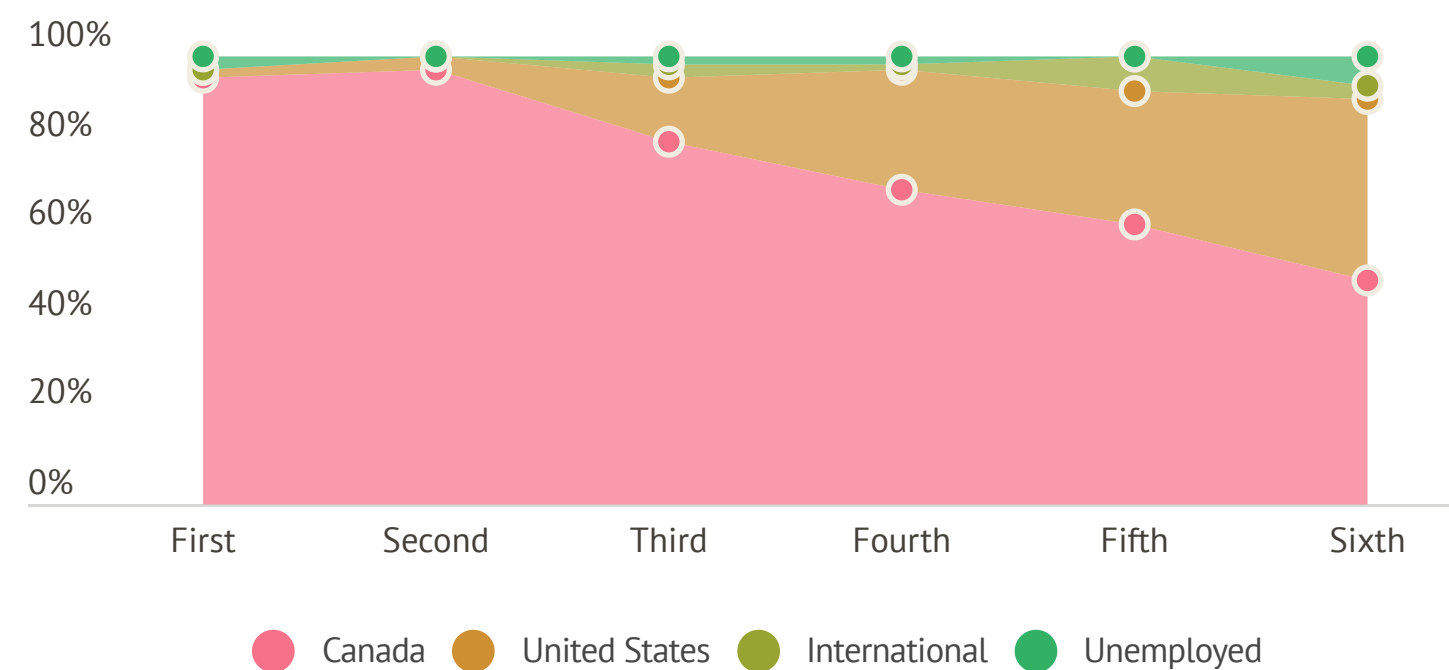
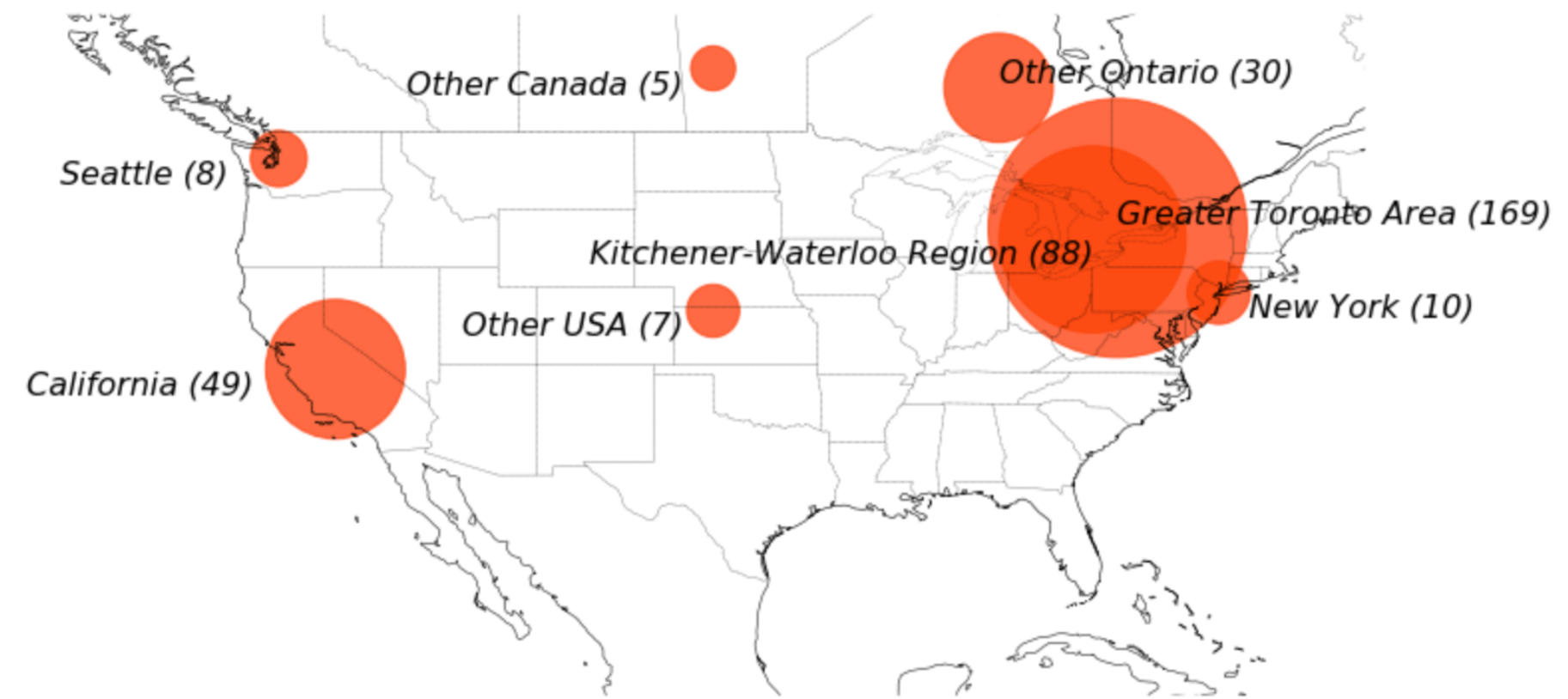
# SALARY

An overview of salaries per term show a consistent increase in average salary, for both CAD- and USD-paying jobs. However, a drastic pay gap can also be seen.



# LOCATION

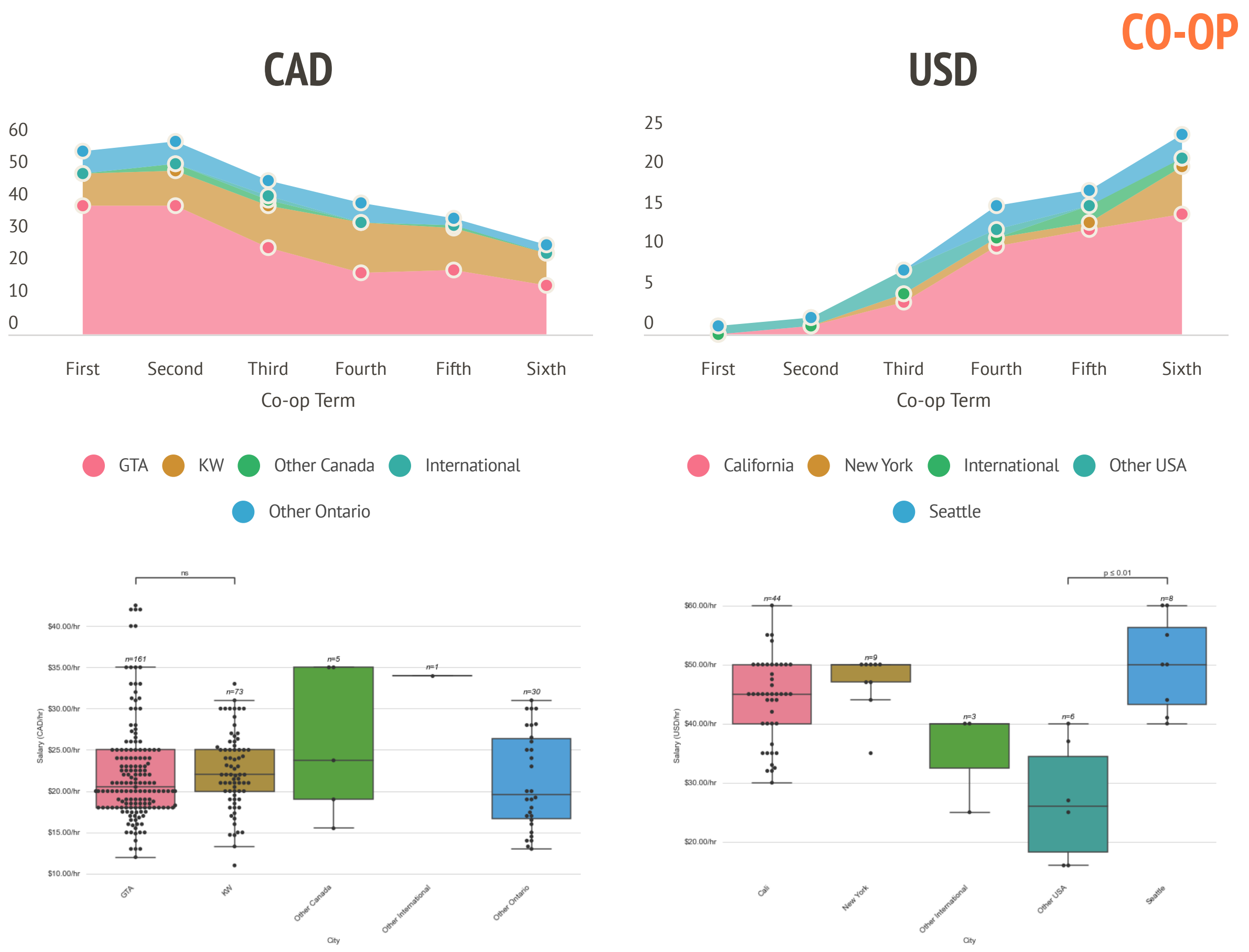
Co-op provided an exciting opportunity for SYDE students to develop new skills and experience living in new cities. Over the six co-op terms, the class actively contributed towards the "Brain Drain", where students increasingly pursued opportunities outside of Canada.



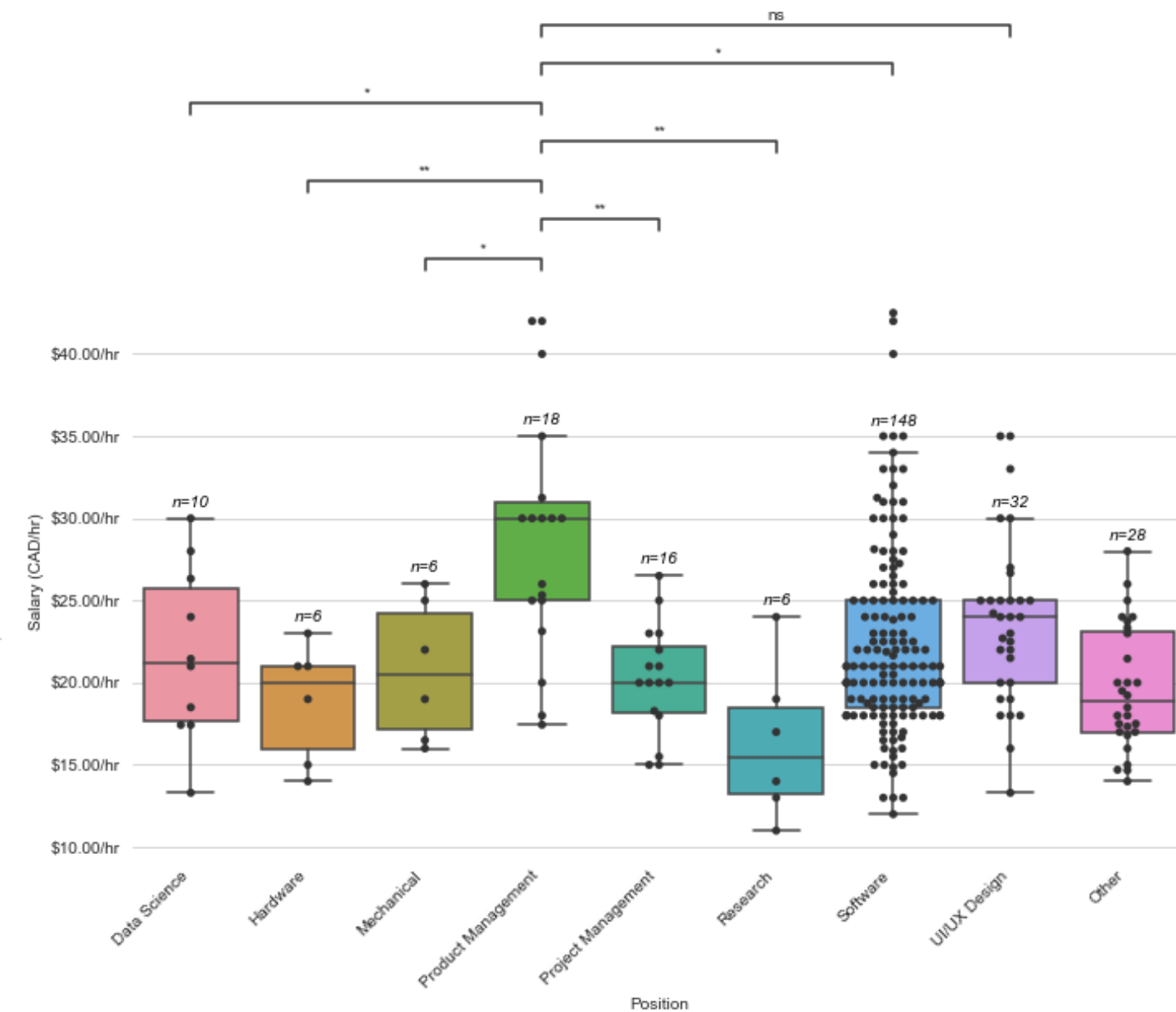
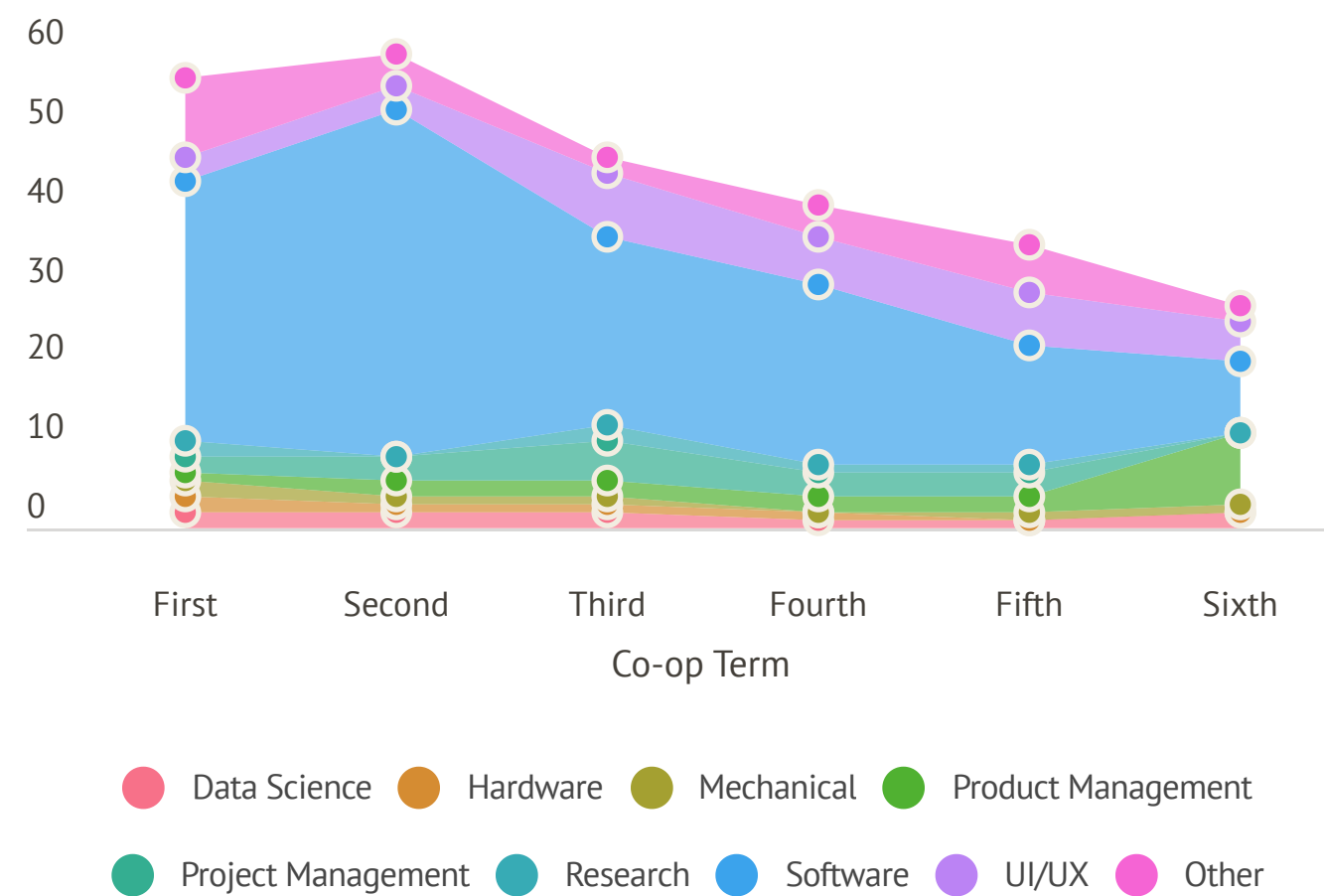


# LOCATION

After the third co-op, California quickly became a popular destination for SYDE students. Despite this apparent preference, the only significantly different average salary is that of students working in Seattle when compared to students working in other areas of the US (which excludes California and New York).

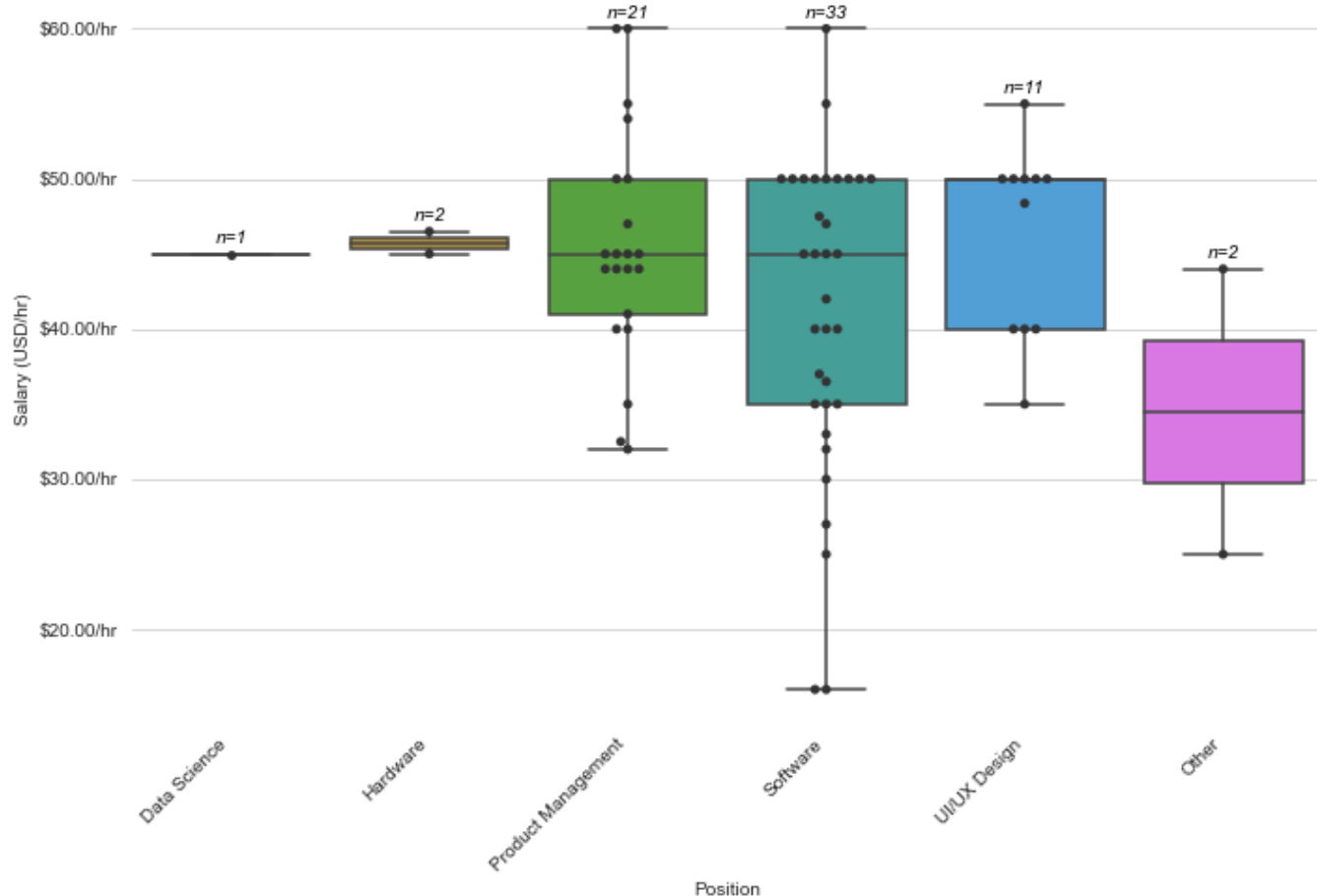
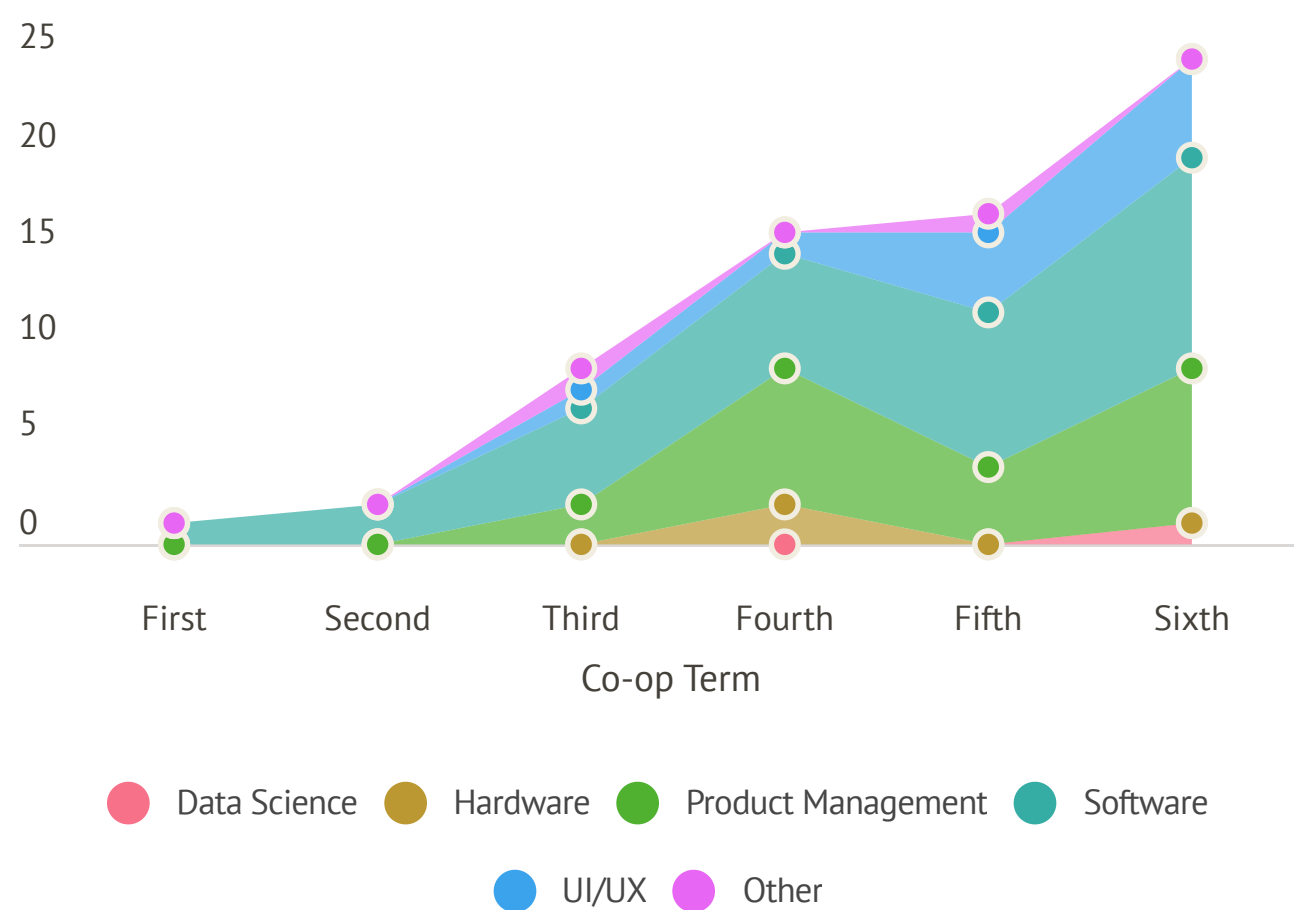


# POSITION (CAD)



Job positions relating to software are still the predominant role, while product management roles seem to fare the best in terms of salary.

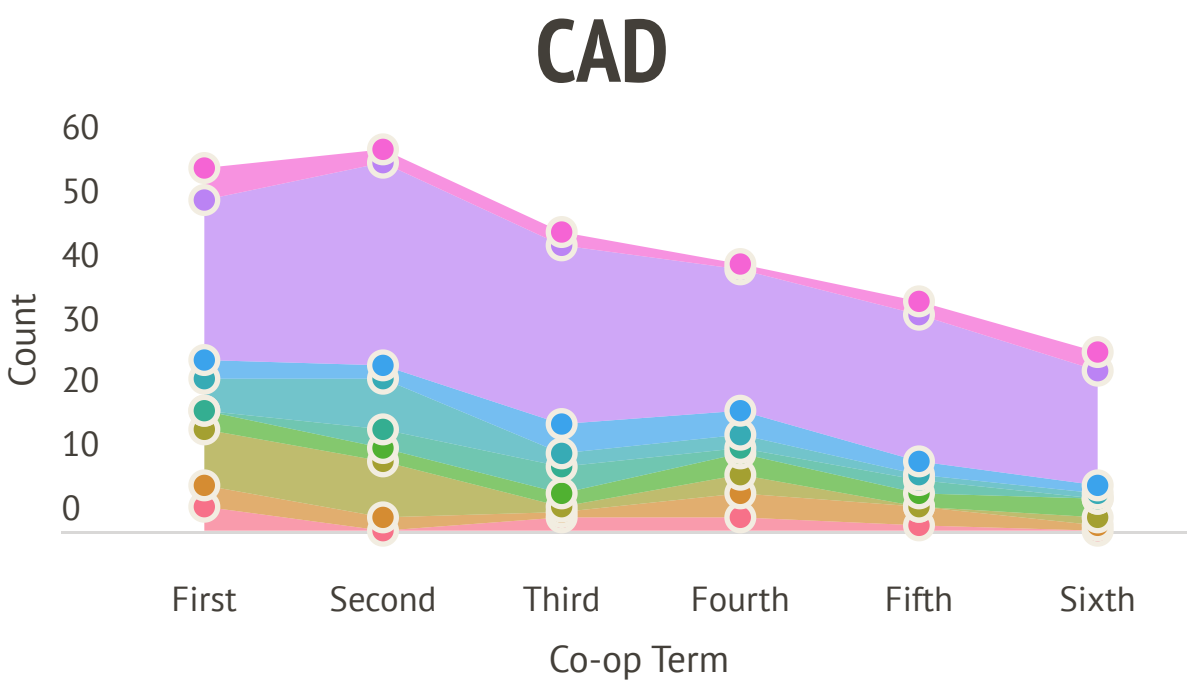
# POSITION (USD)



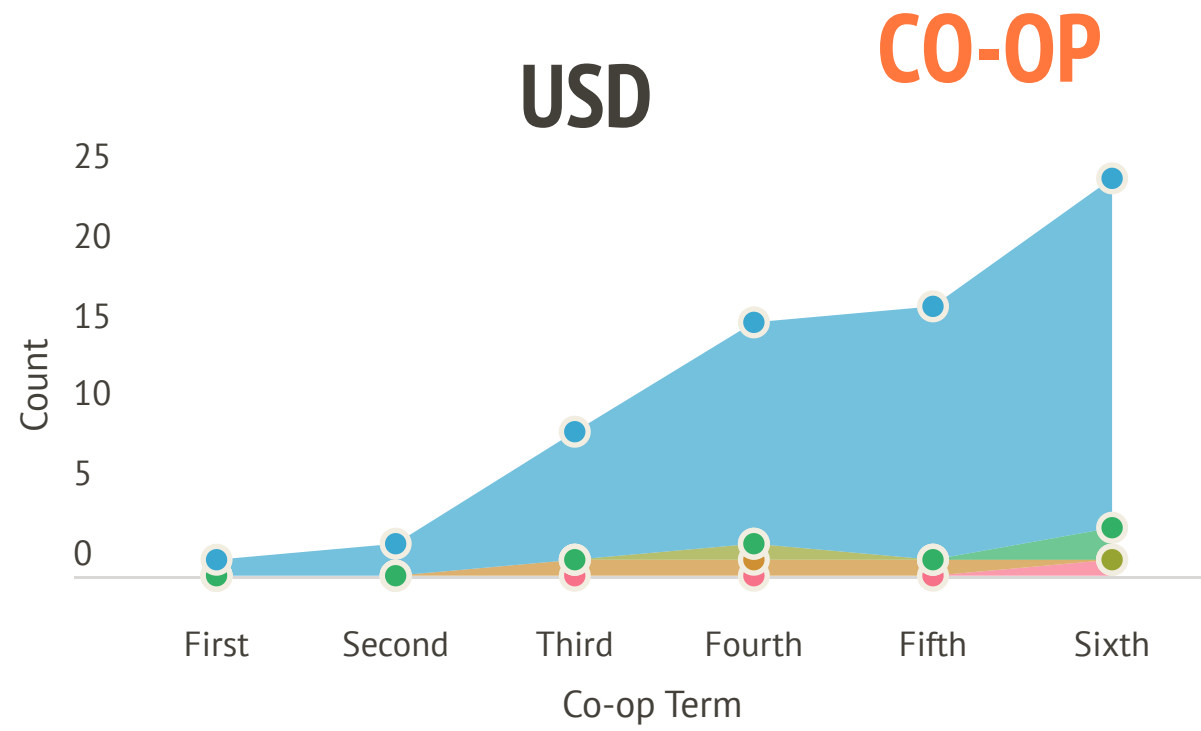
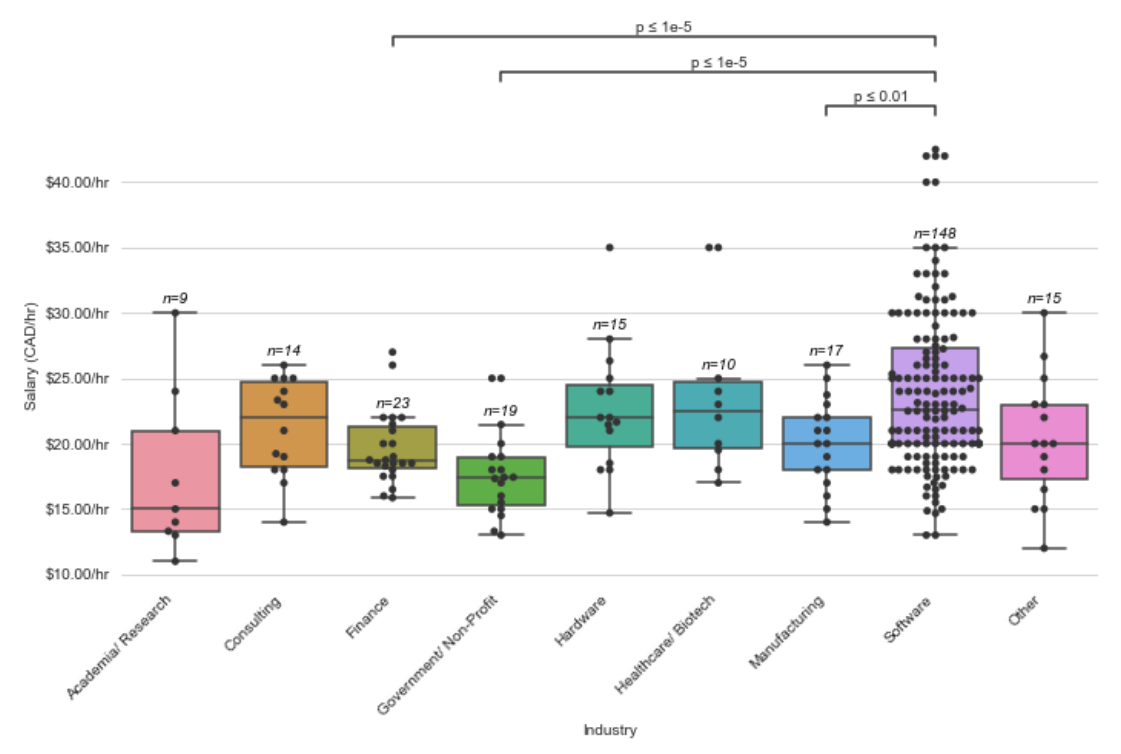
Unlike in Canada, students who worked in the states pursued more diverse roles and no job position earned significantly more than another.

# INDUSTRY

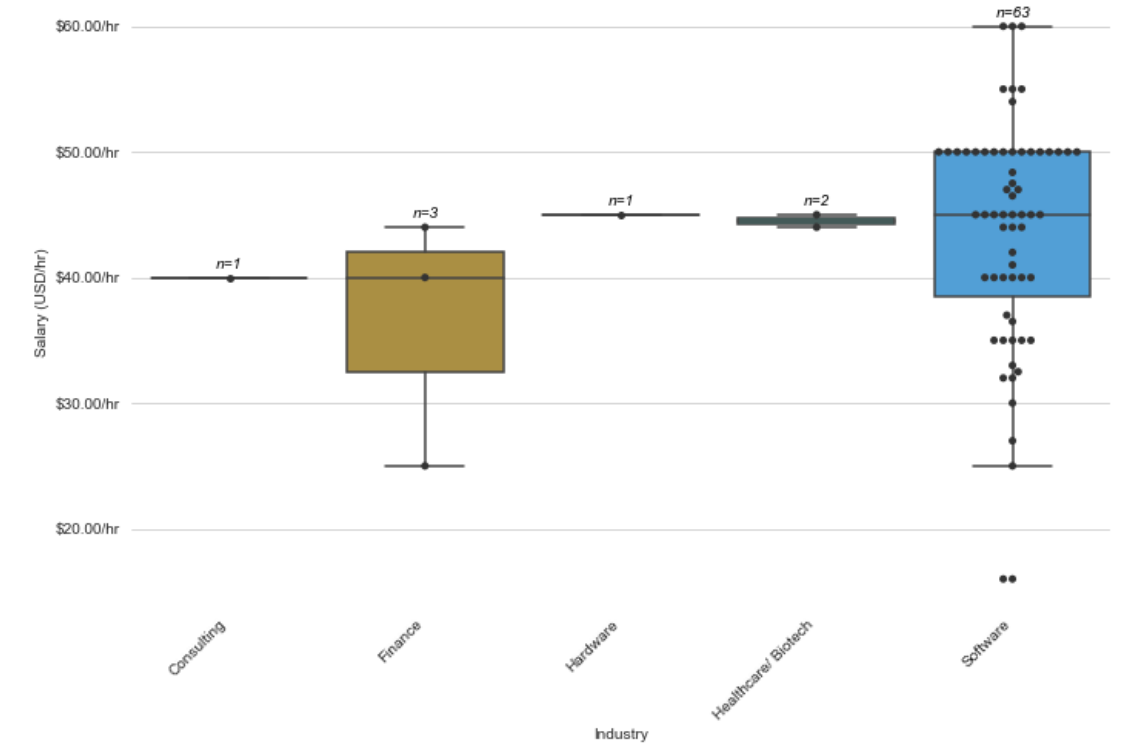
Software was the predominant industry across both Canada and US co-op positions, with wage gaps present in Canada when compared to other industries - namely *finance*, *government/non-profit*, and *manufacturing*.



- Academia/Research
- Consulting
- Finance
- Hardware
- Healthcare/Biotech
- Government/Non-profit
- Manufacturing
- Software
- Other



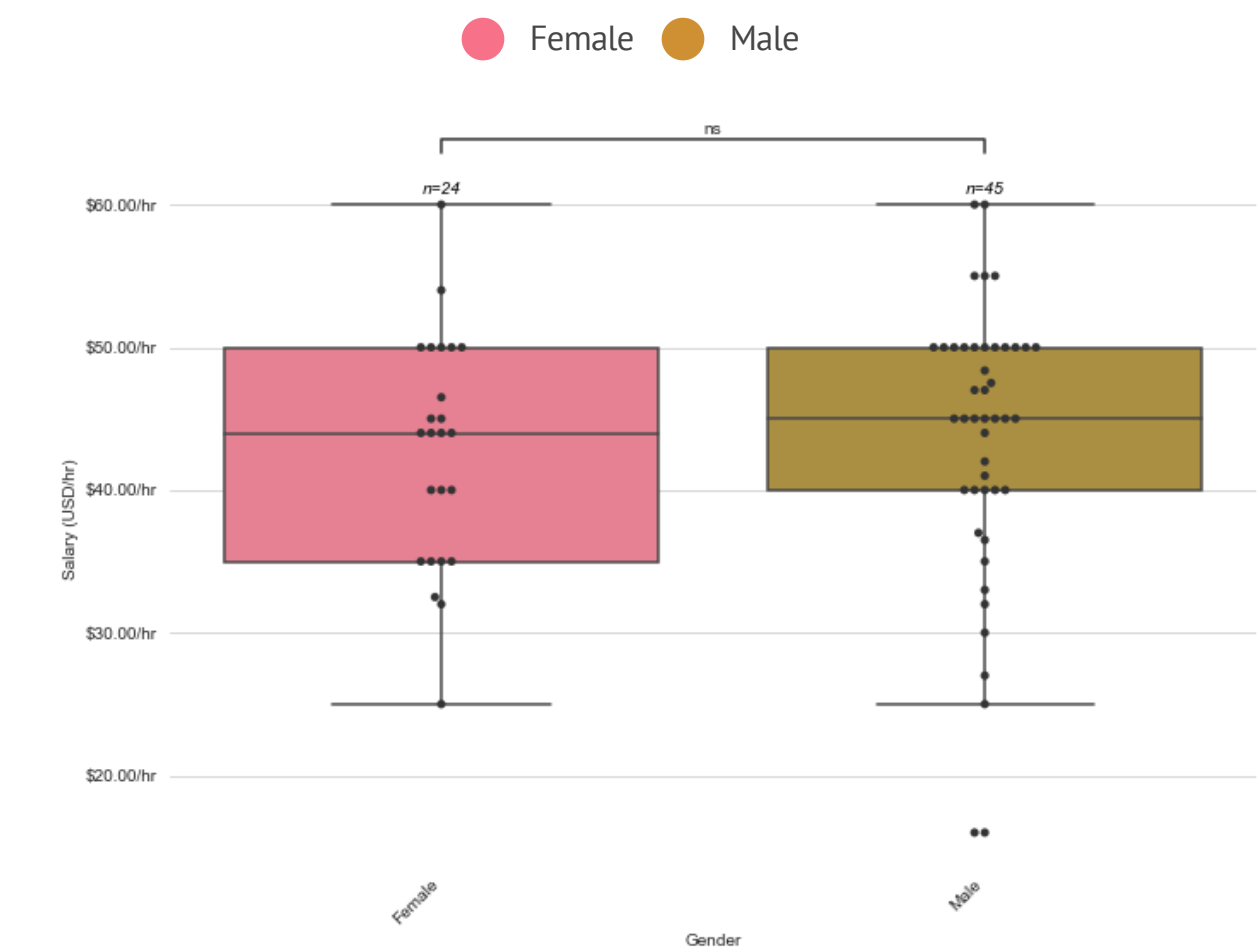
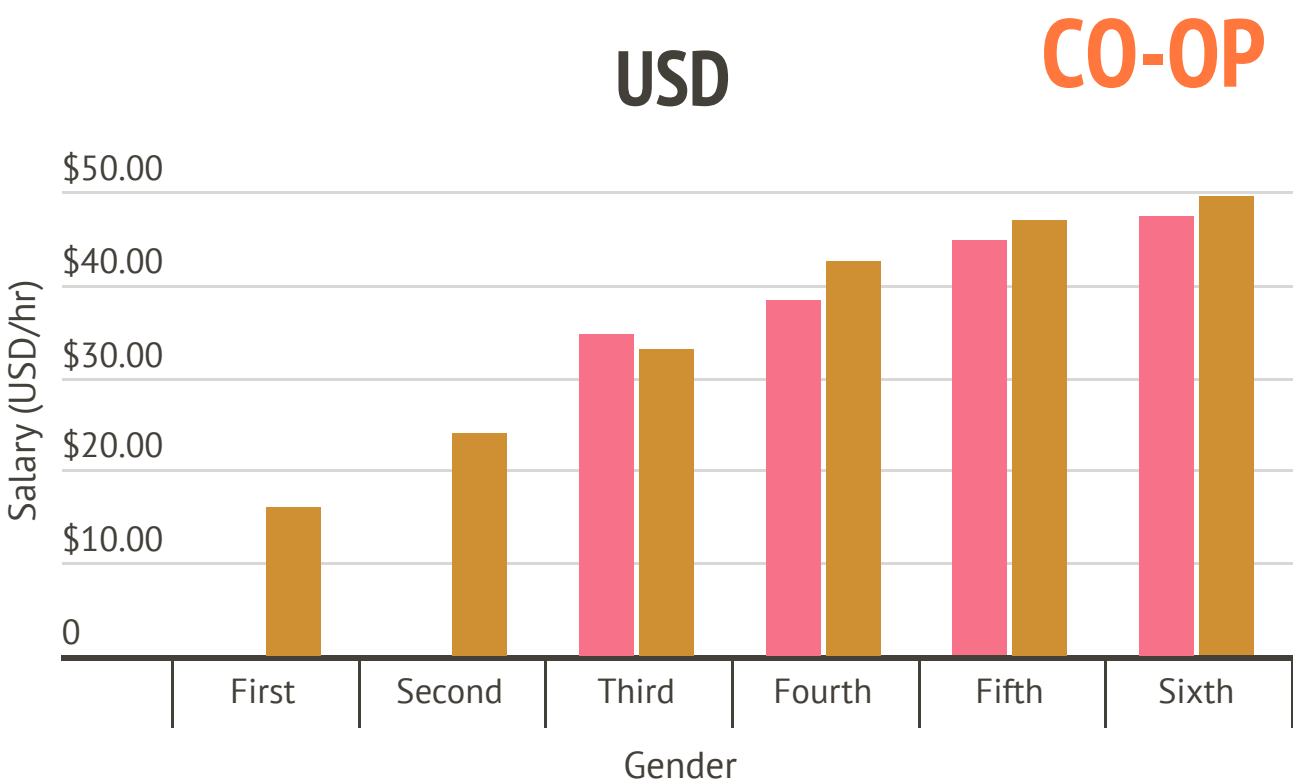
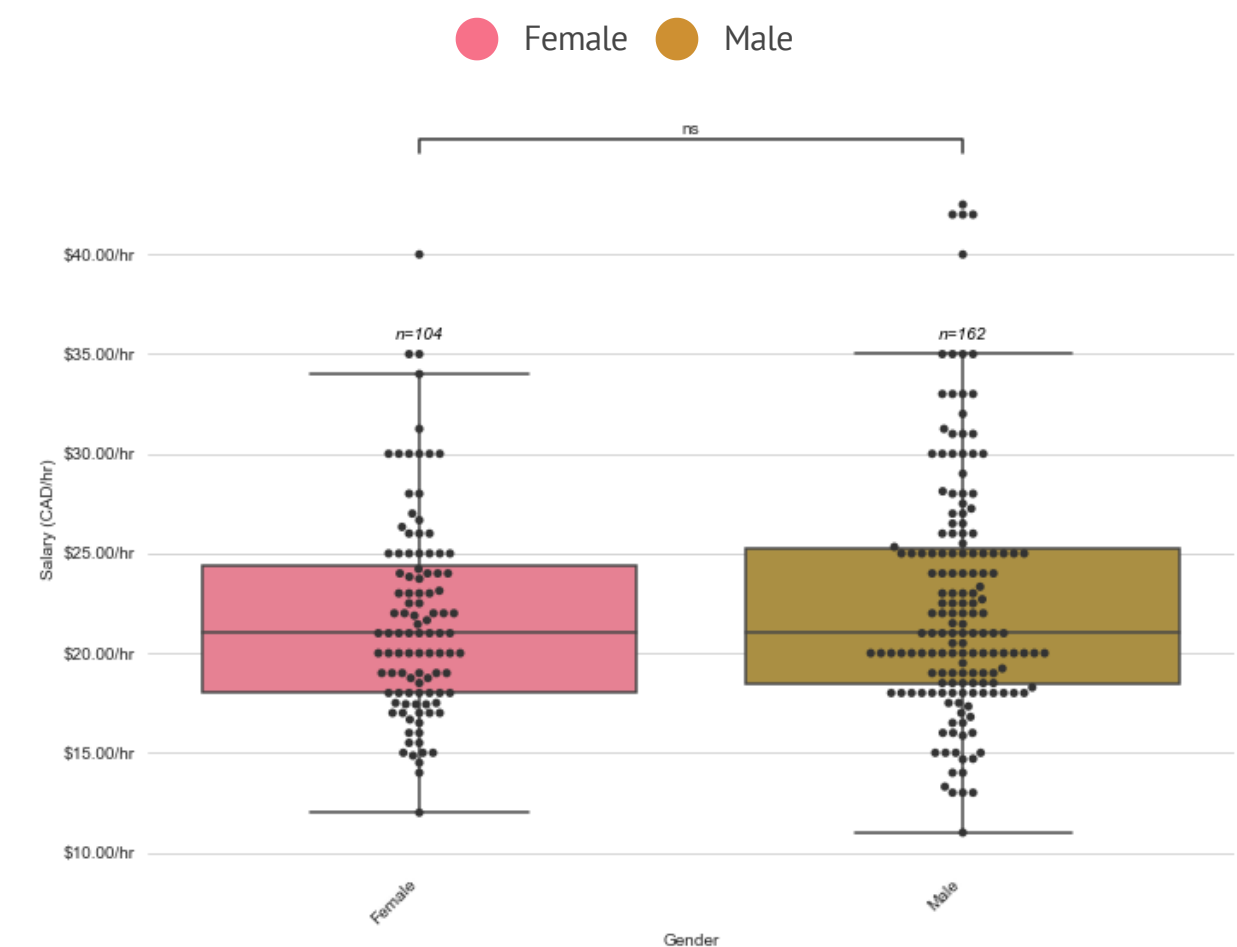
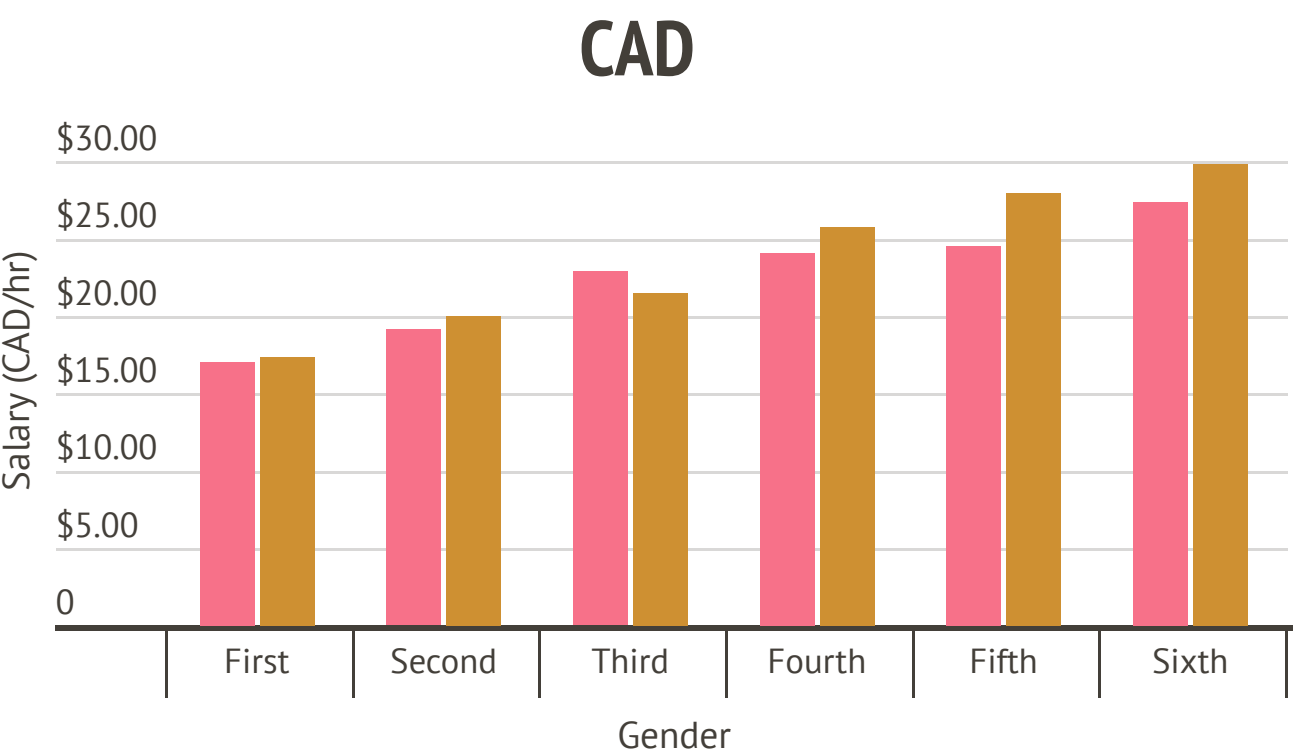
- Consulting
- Finance
- Hardware
- Healthcare/Biotech
- Software



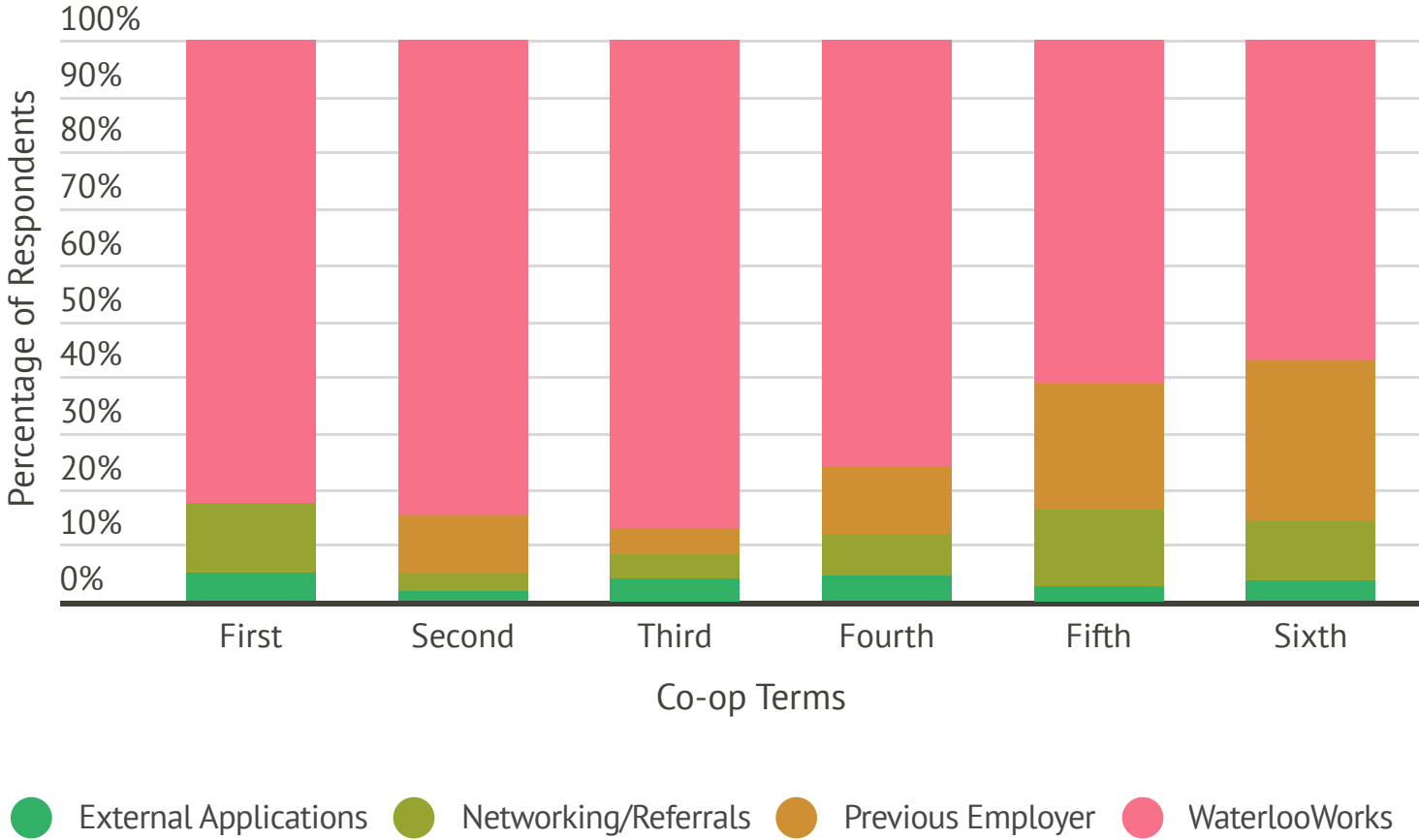


# GENDER

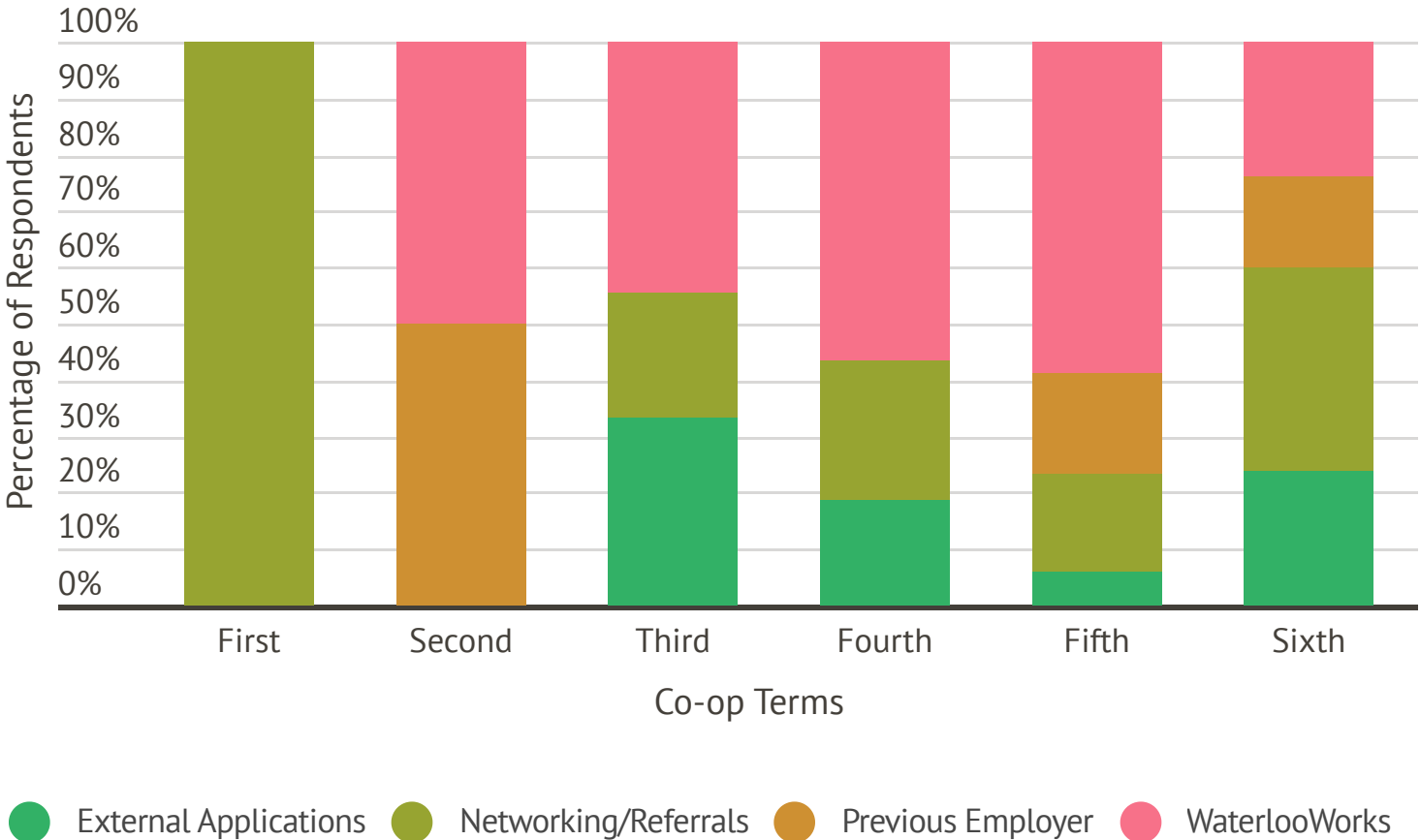
There was no statistically significant wage gap between genders!



# JOB SOURCING



CANADA



UNITED STATES

WaterlooWorks, the online resource for students provided by Waterloo, remained as the main avenue for job sourcing while networking and previous employers gradually increased in relevance in the later terms.

# HOW MUCH DID WE MAKE?

After converting all hourly salaries to CAD,  
with the assumption of 40-hour work weeks  
over six 16-week co-op term, the class made:

**\$6,370,944 CAD**

With a rate of \$1.57 CAD per 1 kg of bananas,  
where the average banana weighs 0.12 kg,  
SYDE 2020 could have purchased:

**33,816,050 bananas**



# LIFESTYLE

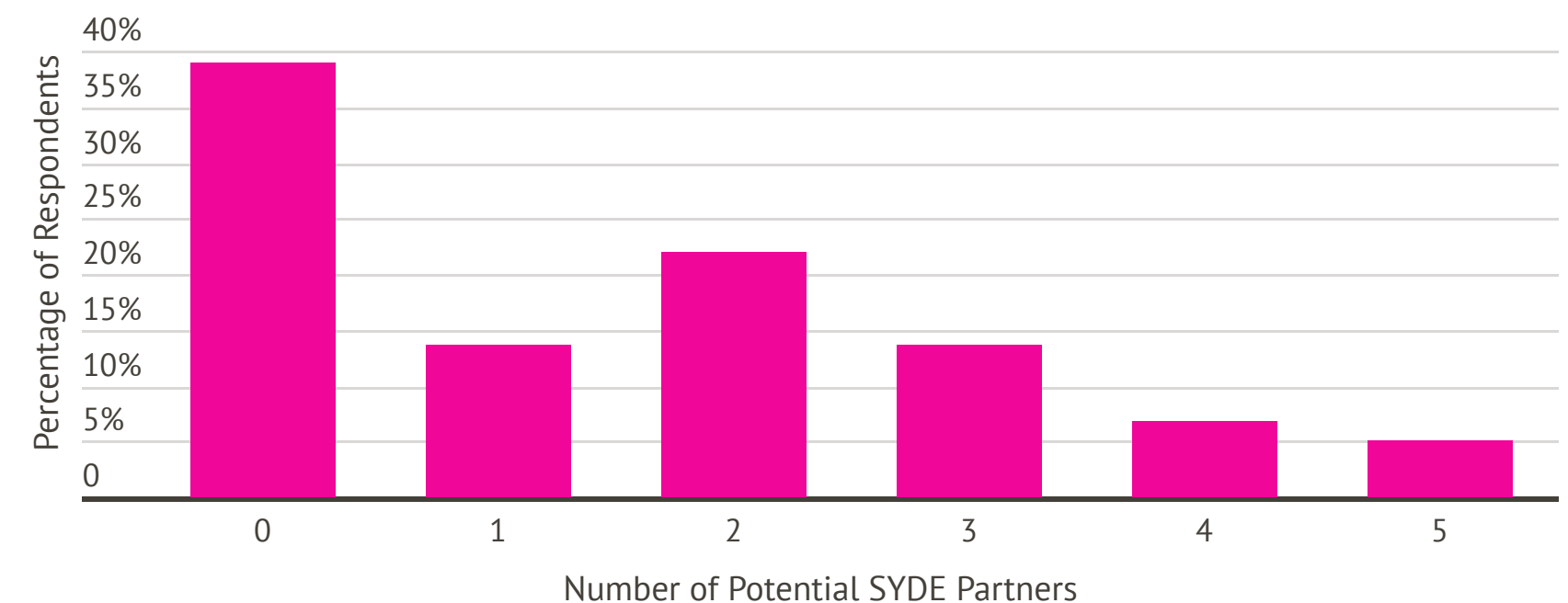
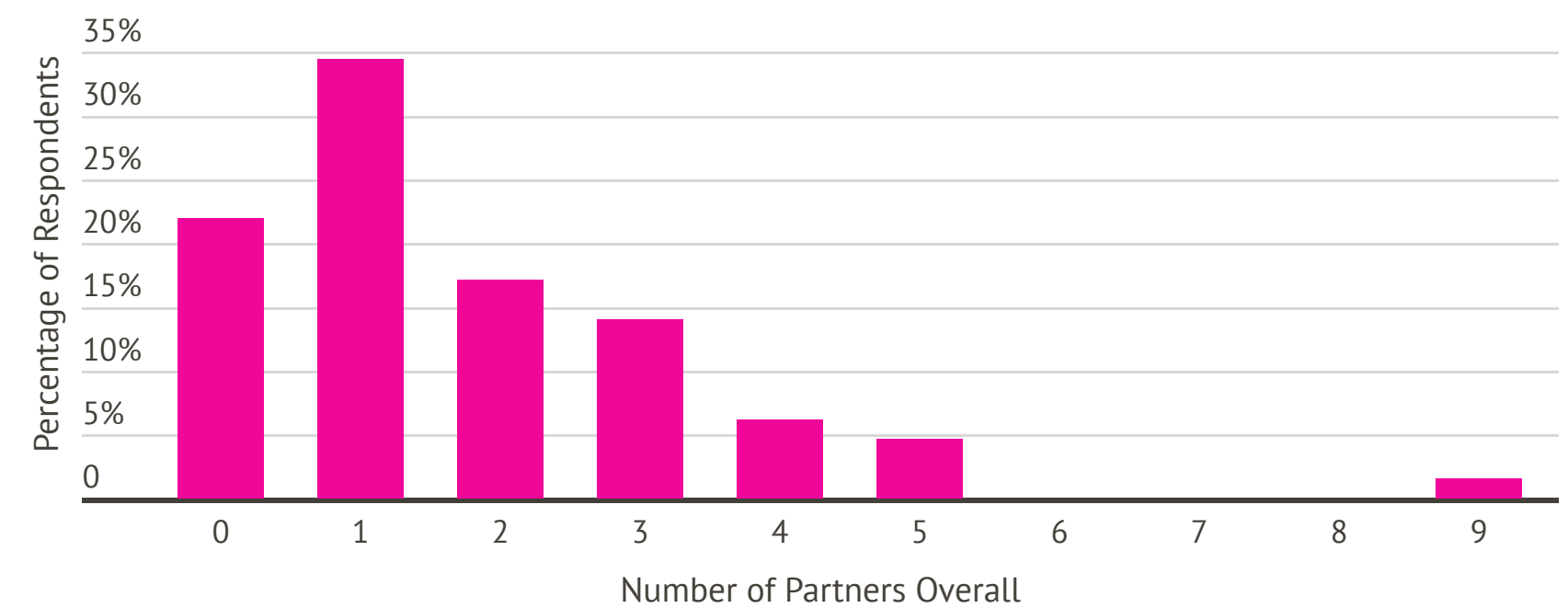
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Meet the 2020 cohort outSYDE the jobs and grades!



# FRIENDS (WITH BENEFITS)

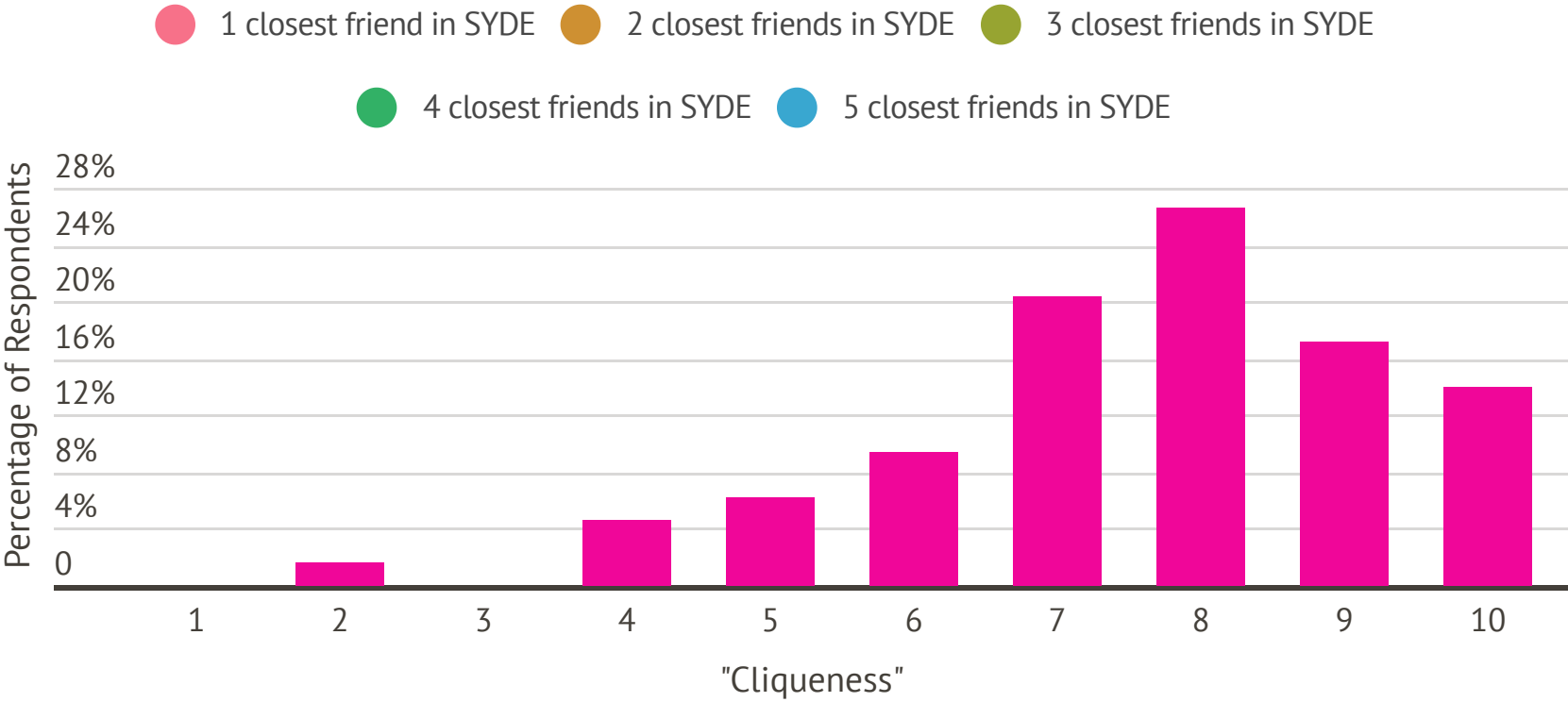
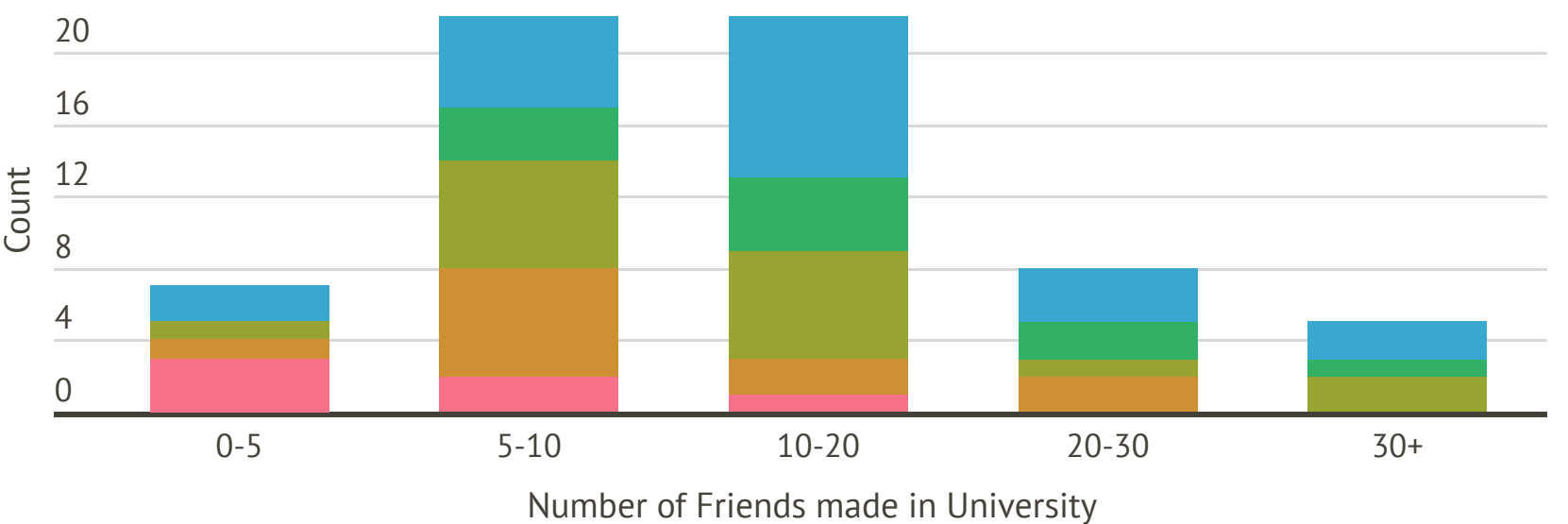
Dating within the department has been a topic of debate. Regardless of the benefits and detriments of an intra-SYDE relationship, the data shows that **22%** of respondents did indeed partake in a relationship with a fellow classmate! The class was also asked how many classmates they would *consider* dating. Surprisingly, **61%** of respondents reported interest in dating one or more students from SYDE.



# FRIENDS

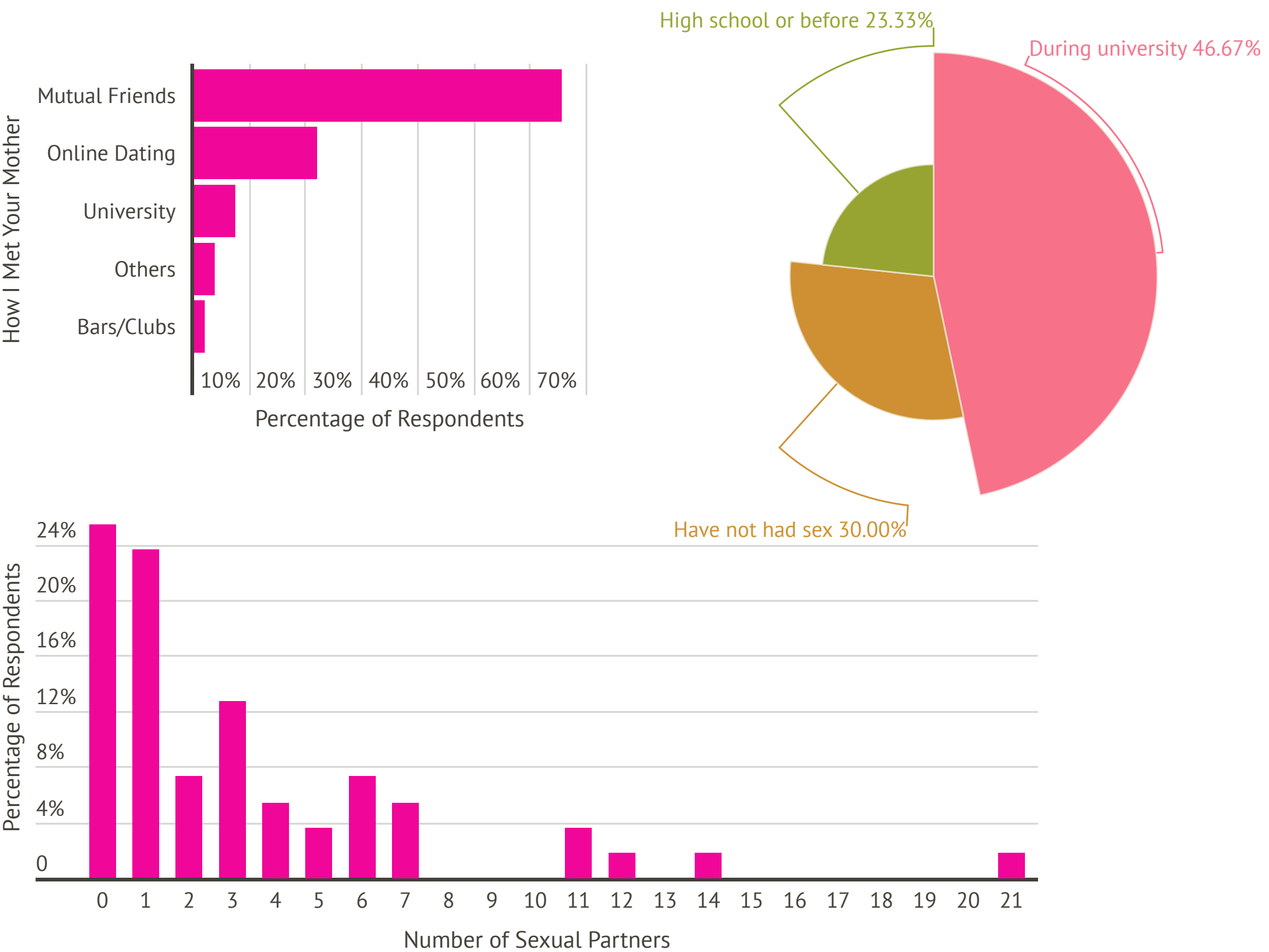
Another question this survey attempts to answer is whether or not SYDE is a *cliquey* program. The 2020 cohort appears to believe so.

A good portion of respondents indicate that their five closest friends are from SYDE, but there is still a healthy amount of respondents who have made many friends outside of the program.



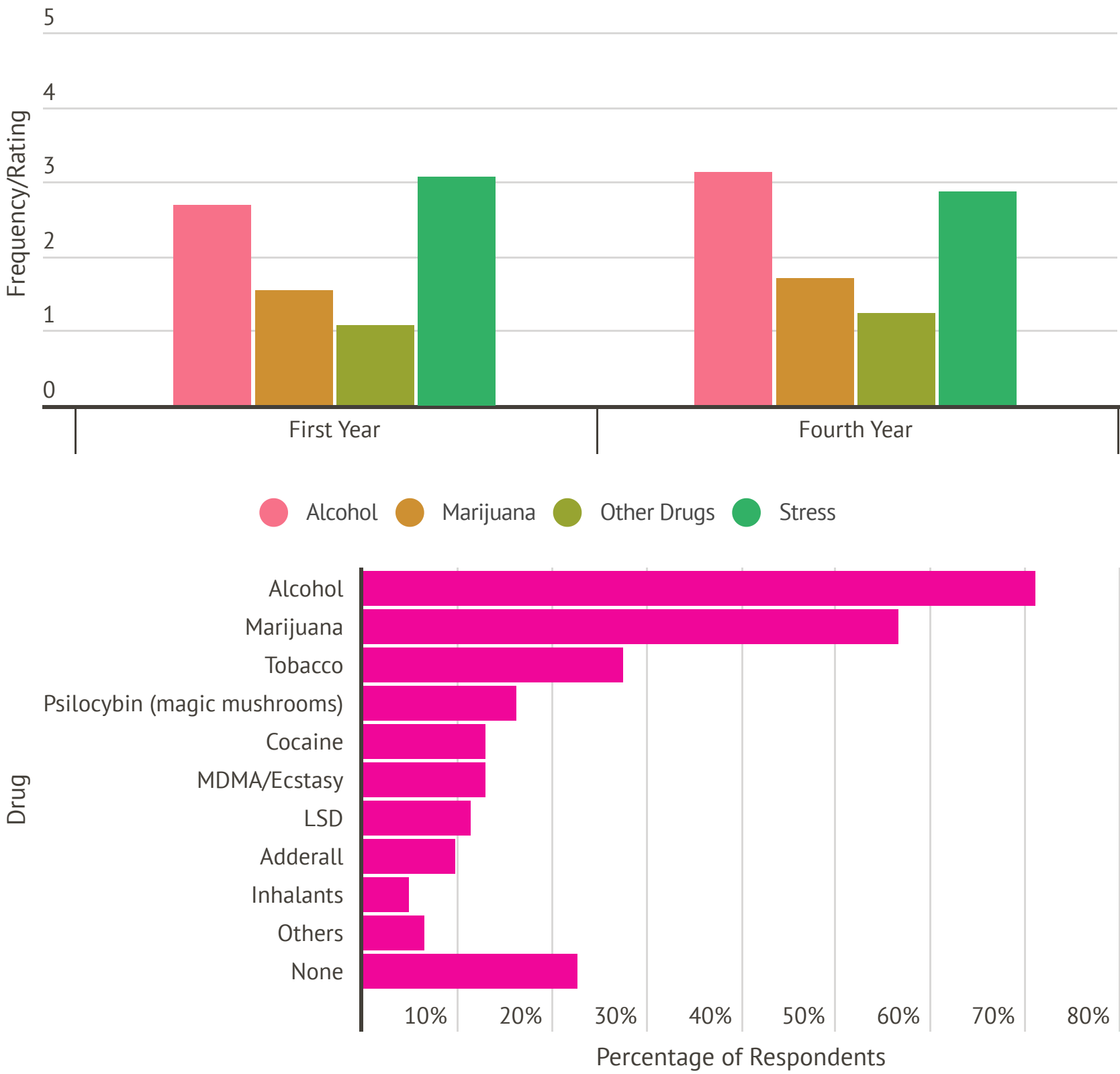
# SEX LIFE

Almost half of the class lost their virginity during their time at the University of Waterloo. Students have found most success in meeting partners through mutual friends, but are not shying away from the world of online dating.

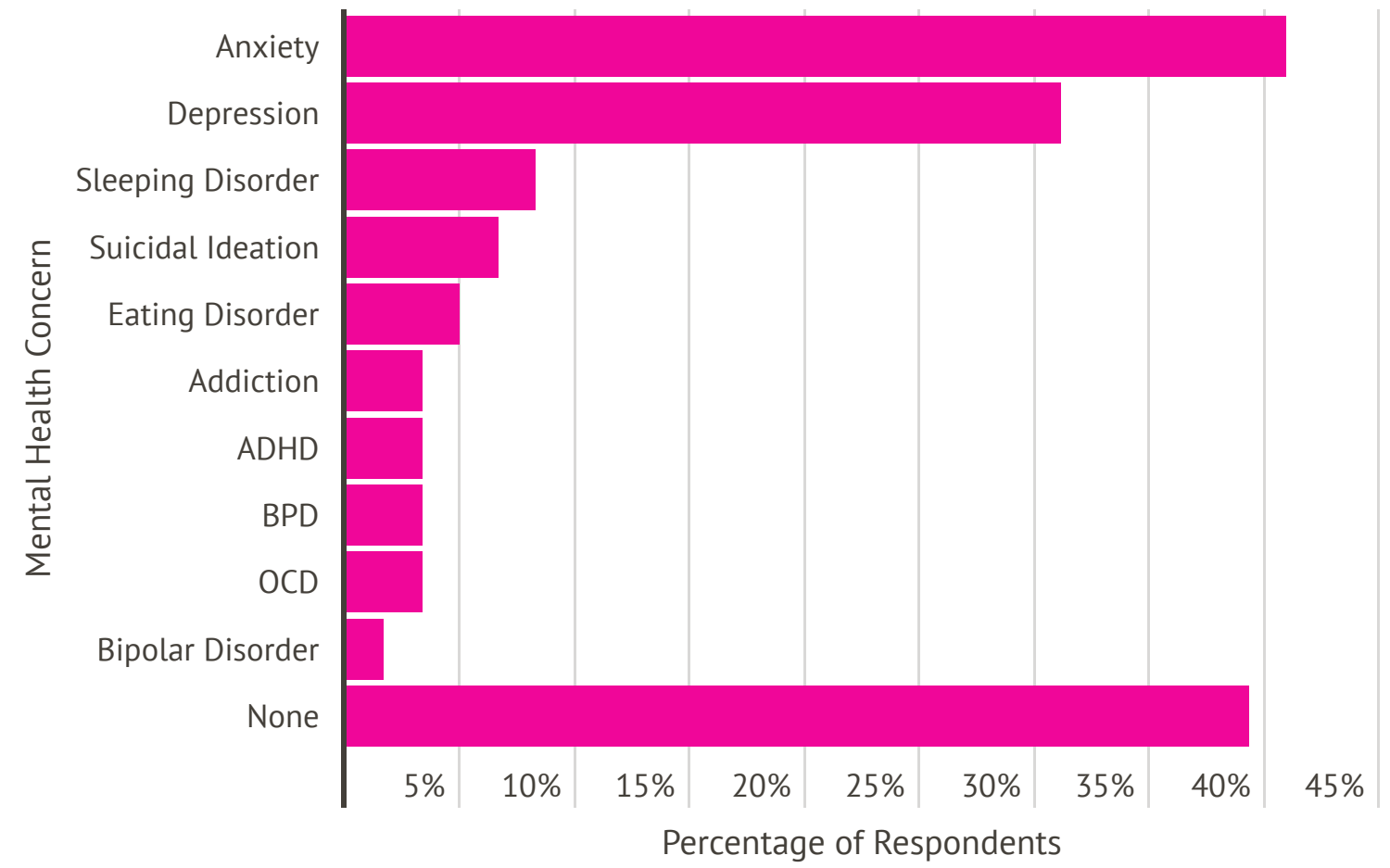


# DRUGS

The class has partaken in a variety of recreational substances, but the most popular ones are still alcohol, marijuana, and tobacco. Interestingly, the reported frequency of drug use does not change very much between first and fourth year - other than a slight increase in alcohol consumption.



# MENTAL HEALTH

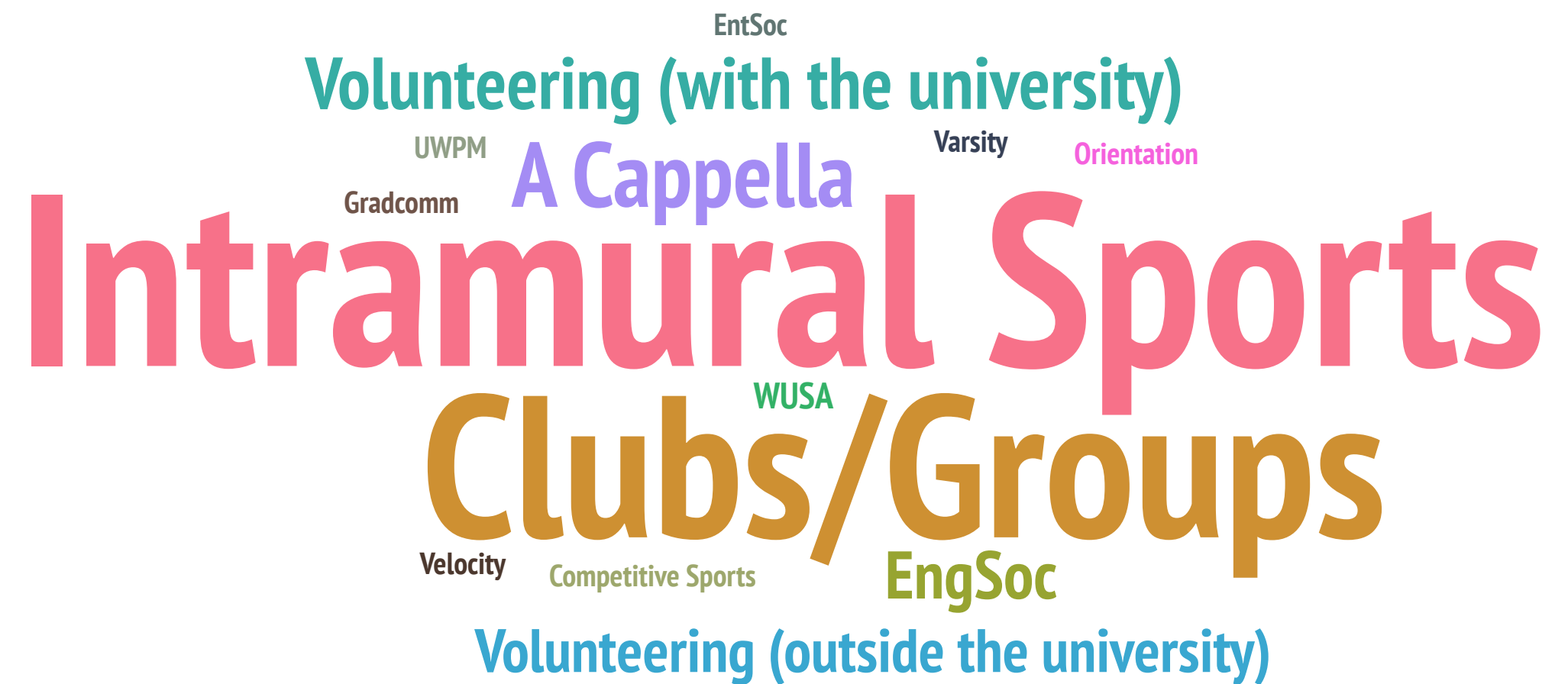


The most prevalent reported mental health concern is anxiety. An investigation into drug use and mental health shows that alcohol and marijuana are not only heavily used by students dealing with anxiety and depression, but also by students with no mental health concerns at all.



# EXTRACURRICULARS

The SYDE 2020 cohort enjoys a variety of extracurricular activities, especially sports and singing!



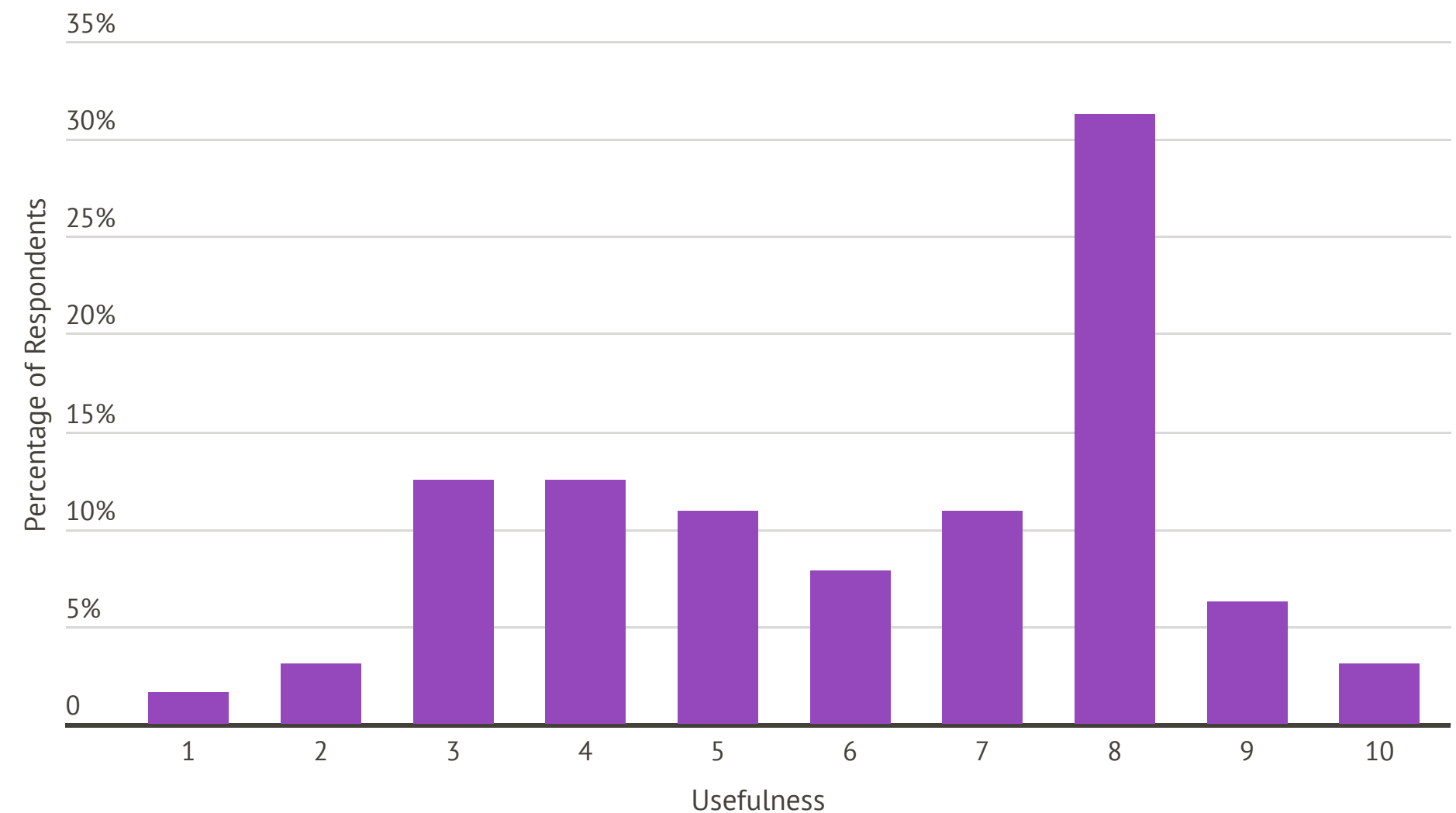
# FUTURE

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Where are we headed now?

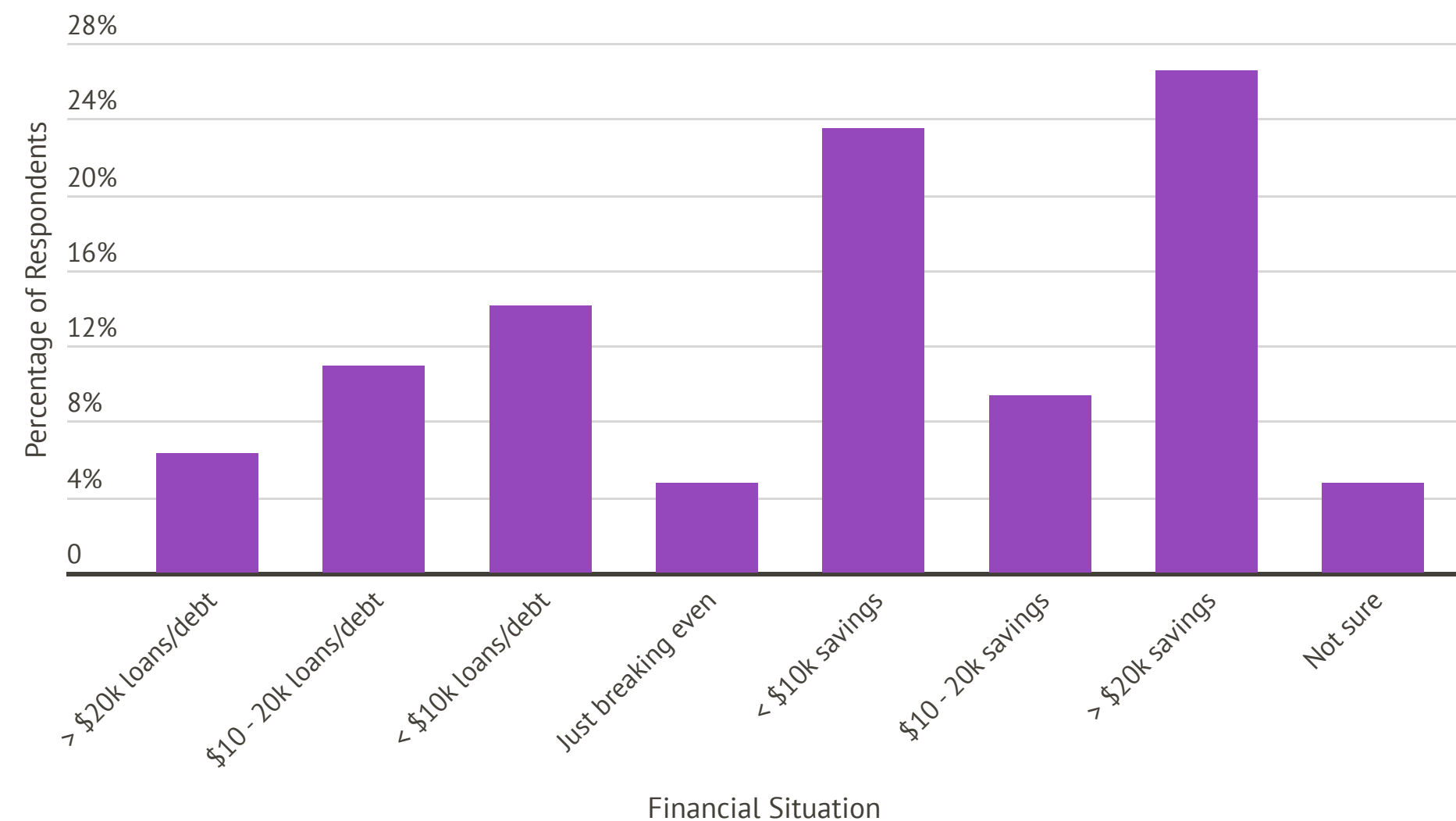
# DEGREE USEFULNESS

The class was asked to rank how useful the degree coursework was for their career from *not at all useful* to *very useful*. Almost **30%** of respondents gave a score below 5 indicating that they did not find the coursework very useful for their chosen careers.



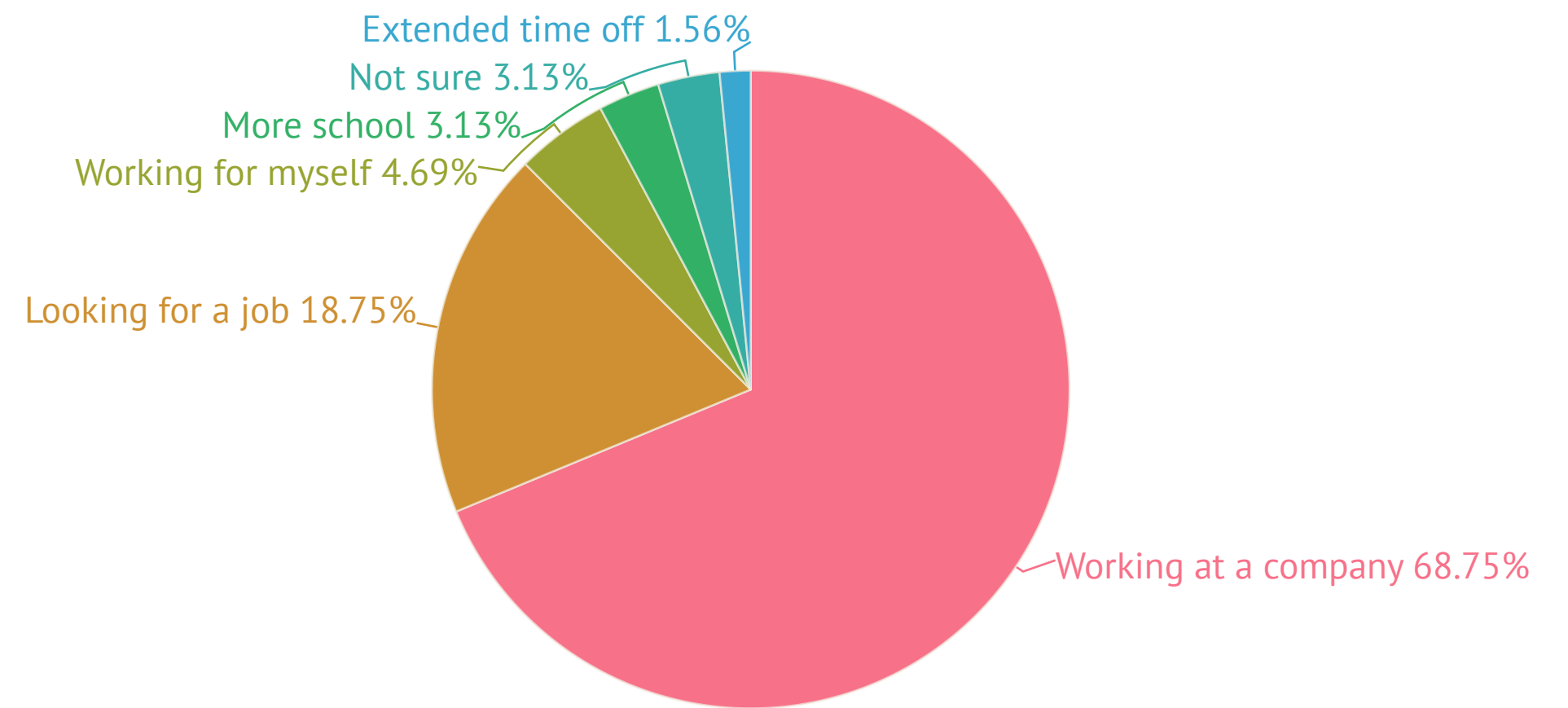
# GRADUATING DEBT

Tuition (just school fees - not including accommodation, housing, or other personal expenses) for the SYDE 2020 class throughout the degree cost almost \$70,000 for Canadians and permanent residents. For international students, tuition was over twice this amount. **64%** of respondents graduated without loans or debt!

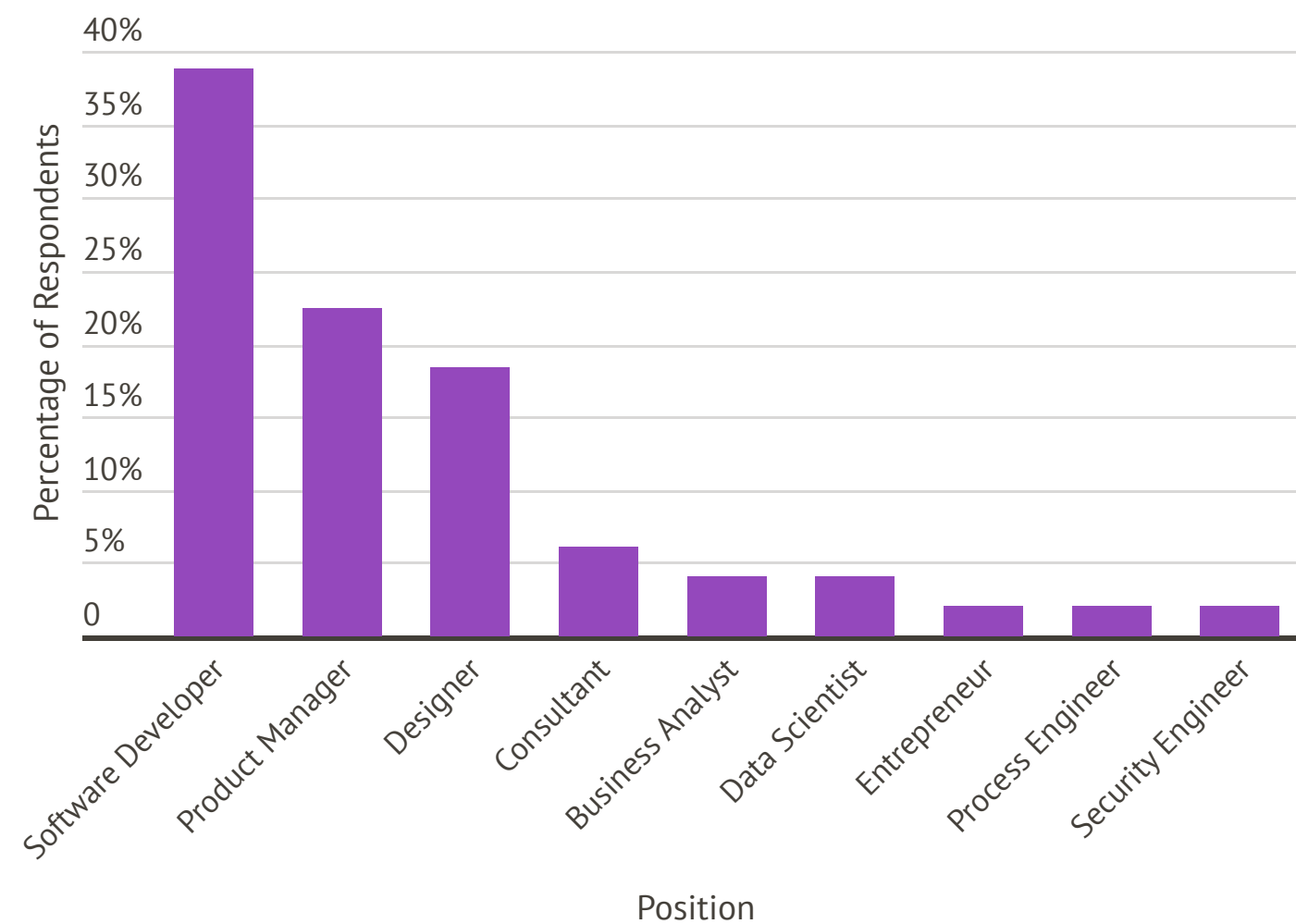


# POST-GRADUATION PLANS

Only a small portion of the class is pursuing further education (with intended programs of *Food Design and Innovation* and *Neuroinformatics*). Over **92%** of respondents are planning on working without extended time off following graduation.



# FULL TIME JOBS

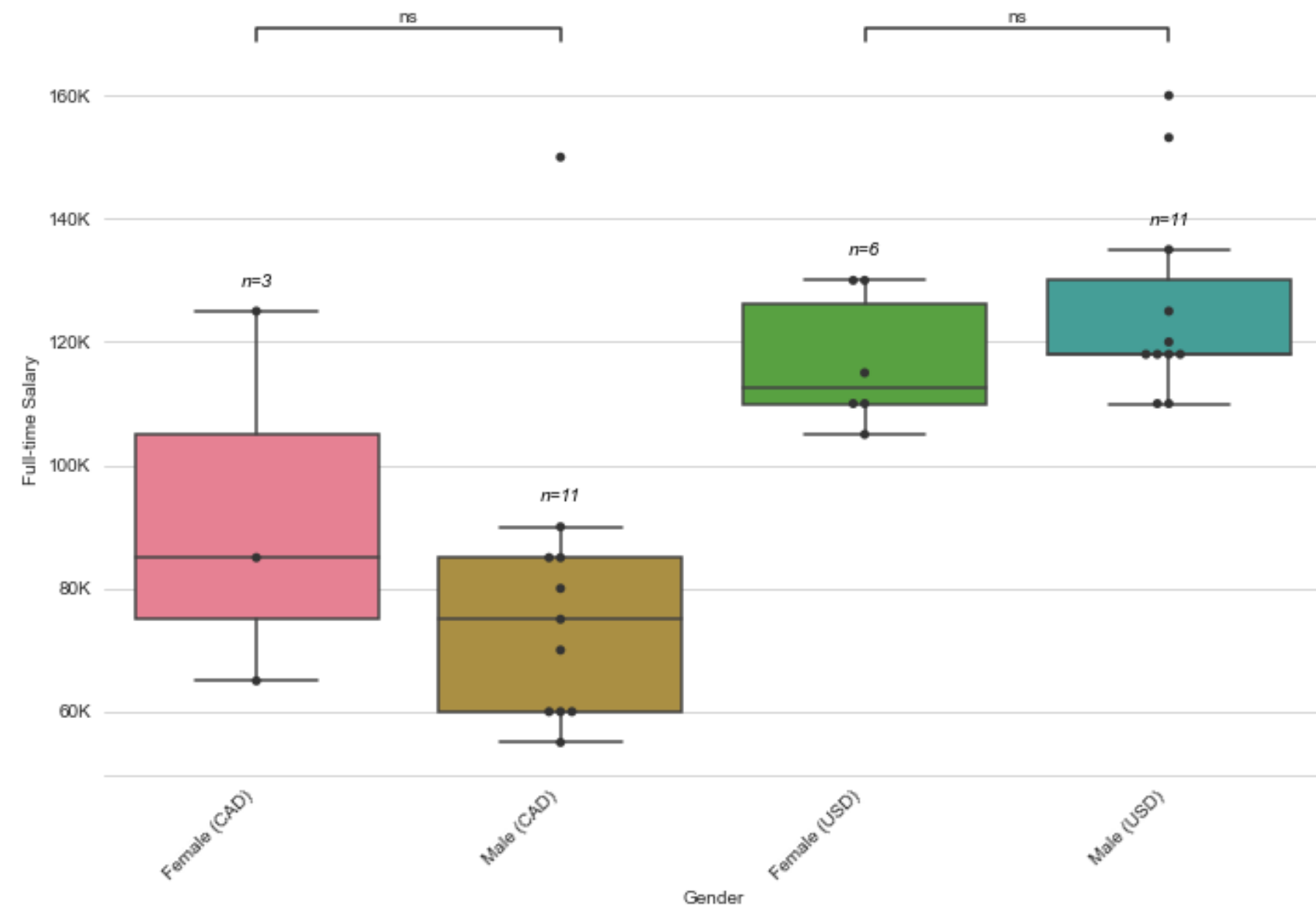


Over **45%** of students that responded with full time jobs are relocating outside of Canada. Many refer to the move across the border as the "Brain Drain" due to higher paying positions attracting newly graduated Canadians.



# FULL TIME COMPENSATION

Salaries in the United States are generally higher than the ones in Canada. Assuming an exchange rate of 1 USD = 1.3 CAD, US salaries average **\$12,566 CAD** more than Canadian ones. On the bright side, it seems that the lack of gender pay gap extends beyond the class's co-op experiences and holds true for full time compensation as well!



# RETURNING TO CANADA

**34%** of respondents with full time positions outside of Canada stated they plan on returning to the country for *family* reasons. Only **9%** do not plan on returning.

A word cloud visualizing reasons for returning to Canada. The words are arranged in a cluster, with 'Environment/Community' being the largest and most prominent in pink. Other words include 'Family' in large green, 'Friends' in large orange, 'Politics' in teal, 'Partner' in green, and 'Healthcare' in small blue.

Environment/Community  
Family  
Healthcare  
Politics  
Friends  
Partner

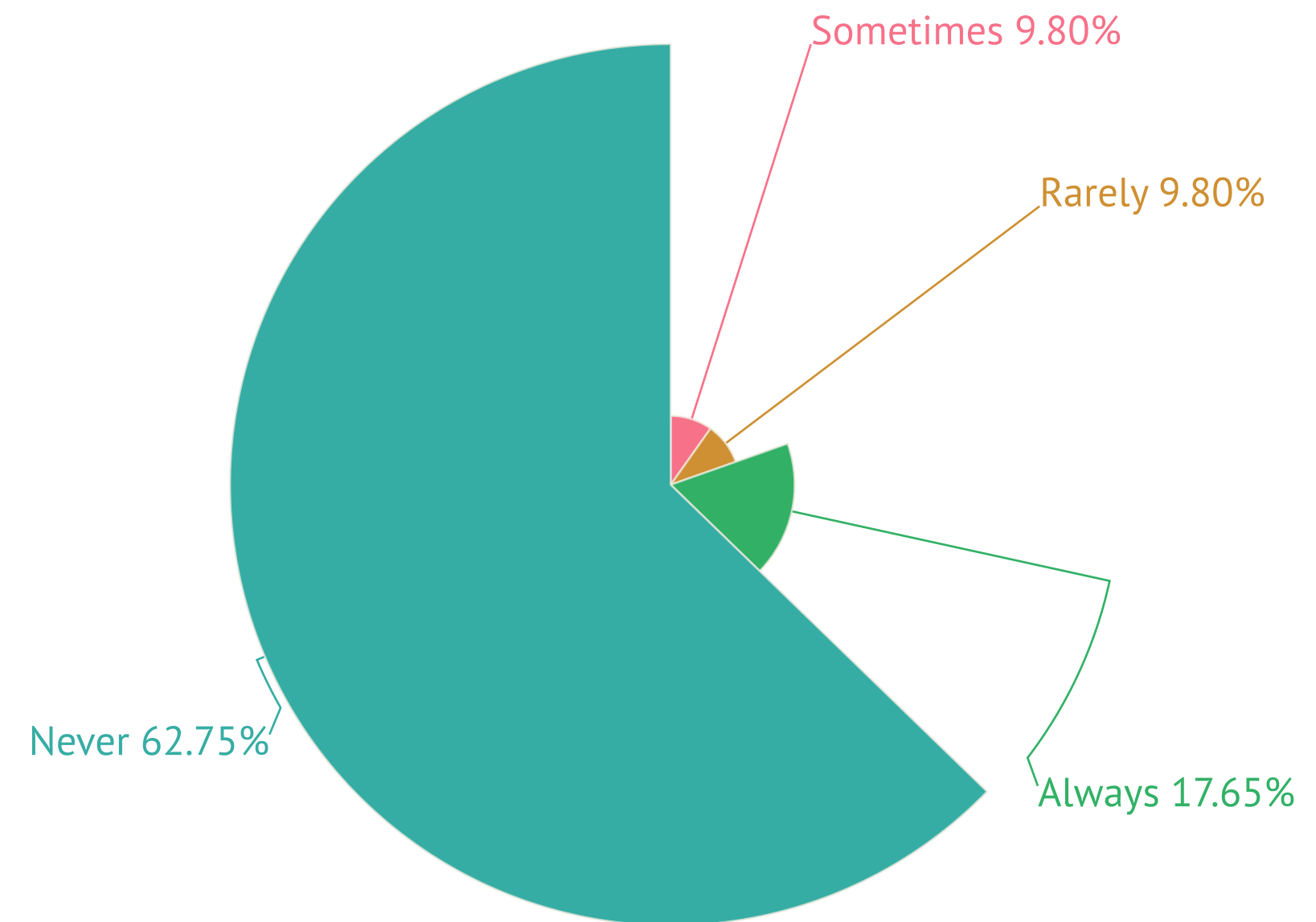
# PANDEMIC

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52/84 (62%) responses regarding the COVID-19 impact.

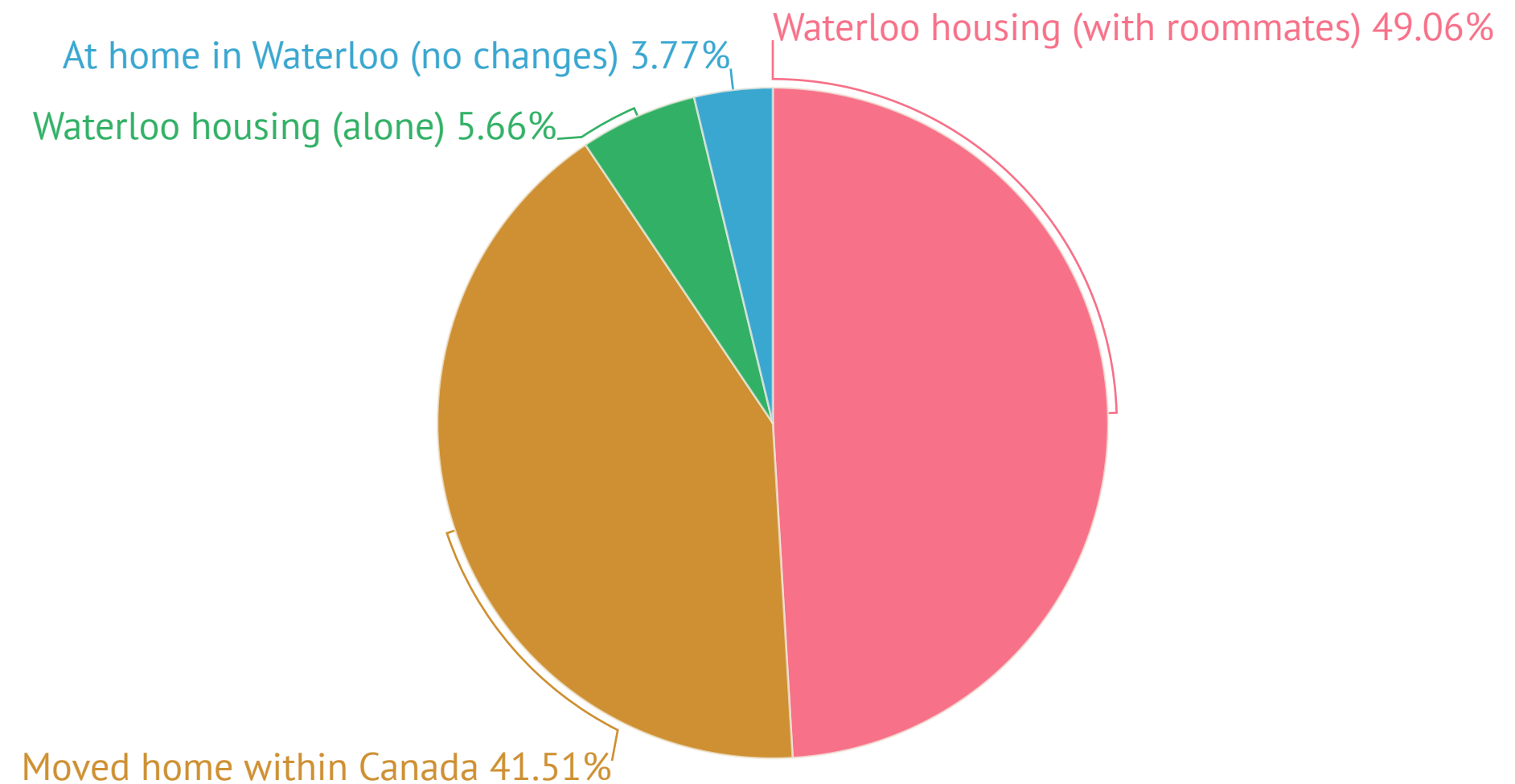
# ONLINE CLASSES

After Waterloo cancelled all in-person classes on March 13th, the class's final semester at Waterloo transitioned to online classes. The majority, **63%** of respondents, never attended another class before finishing their degree.



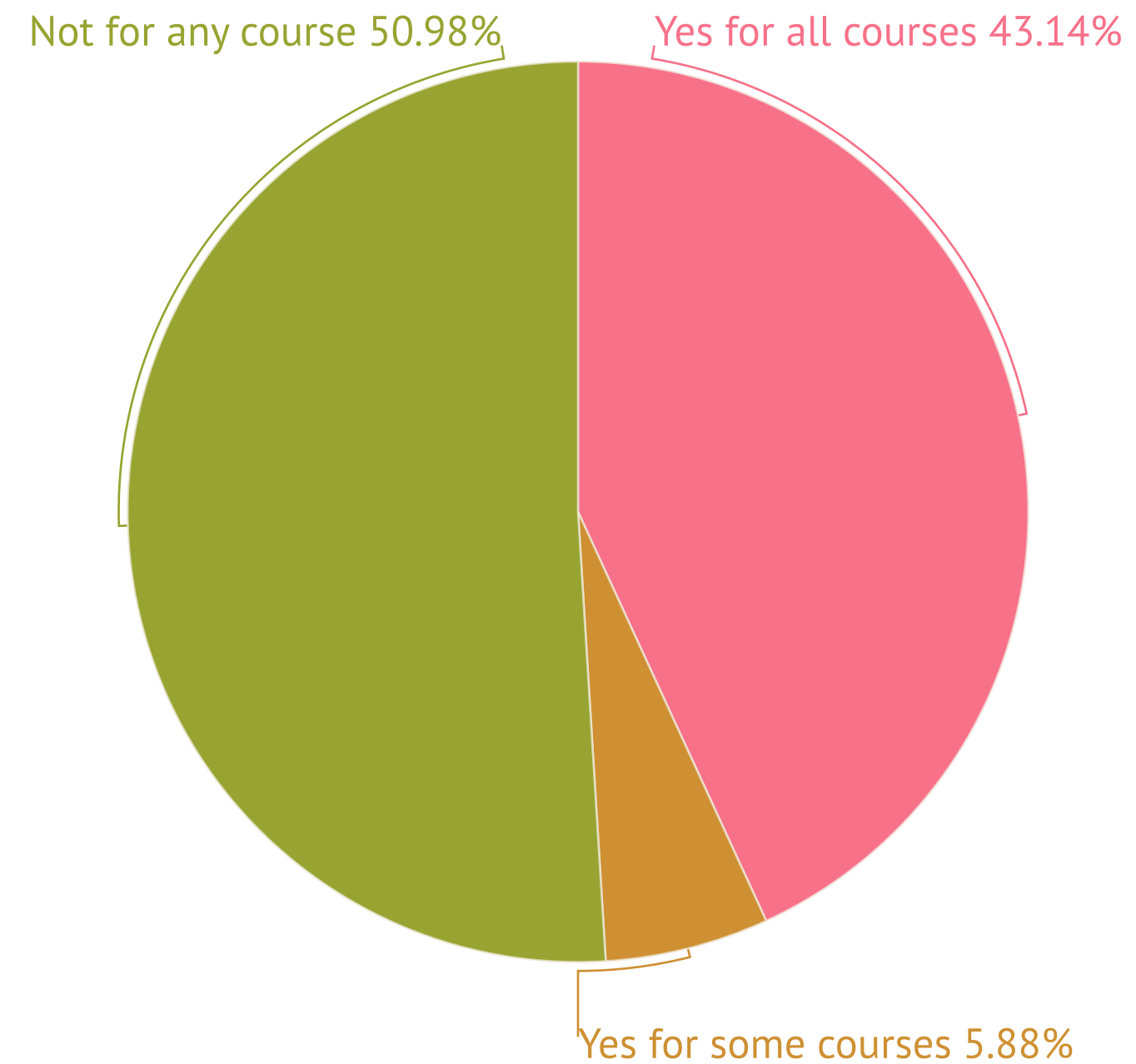
# WHERE DID WE FINISH OUR DEGREE?

Since classes moved online, students had the ability to complete their degree wherever they wanted. **59%** of respondents remained in Waterloo to finish their degree, whereas others took the opportunity to move back home.



# GRADES VS. CR/NCR

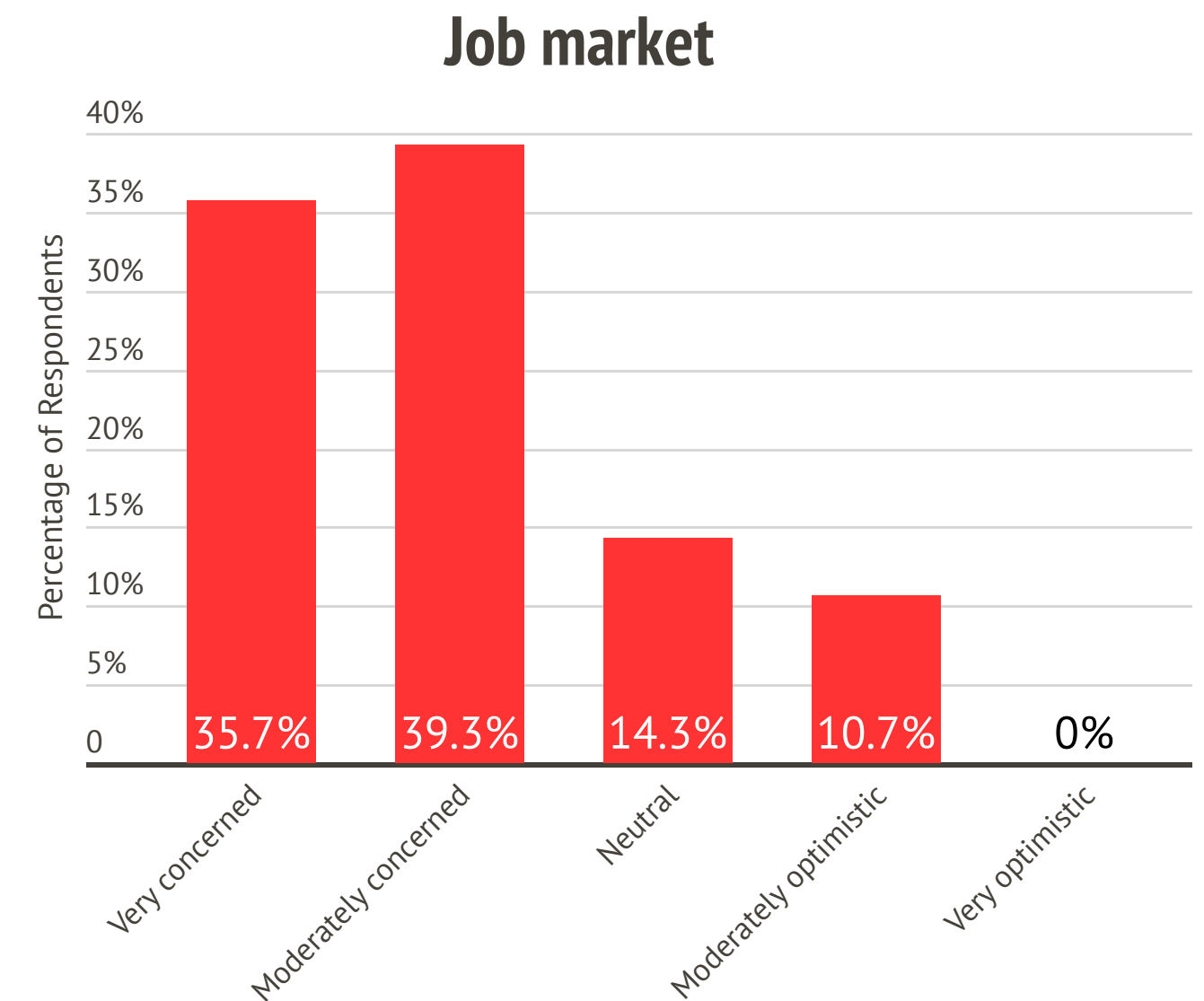
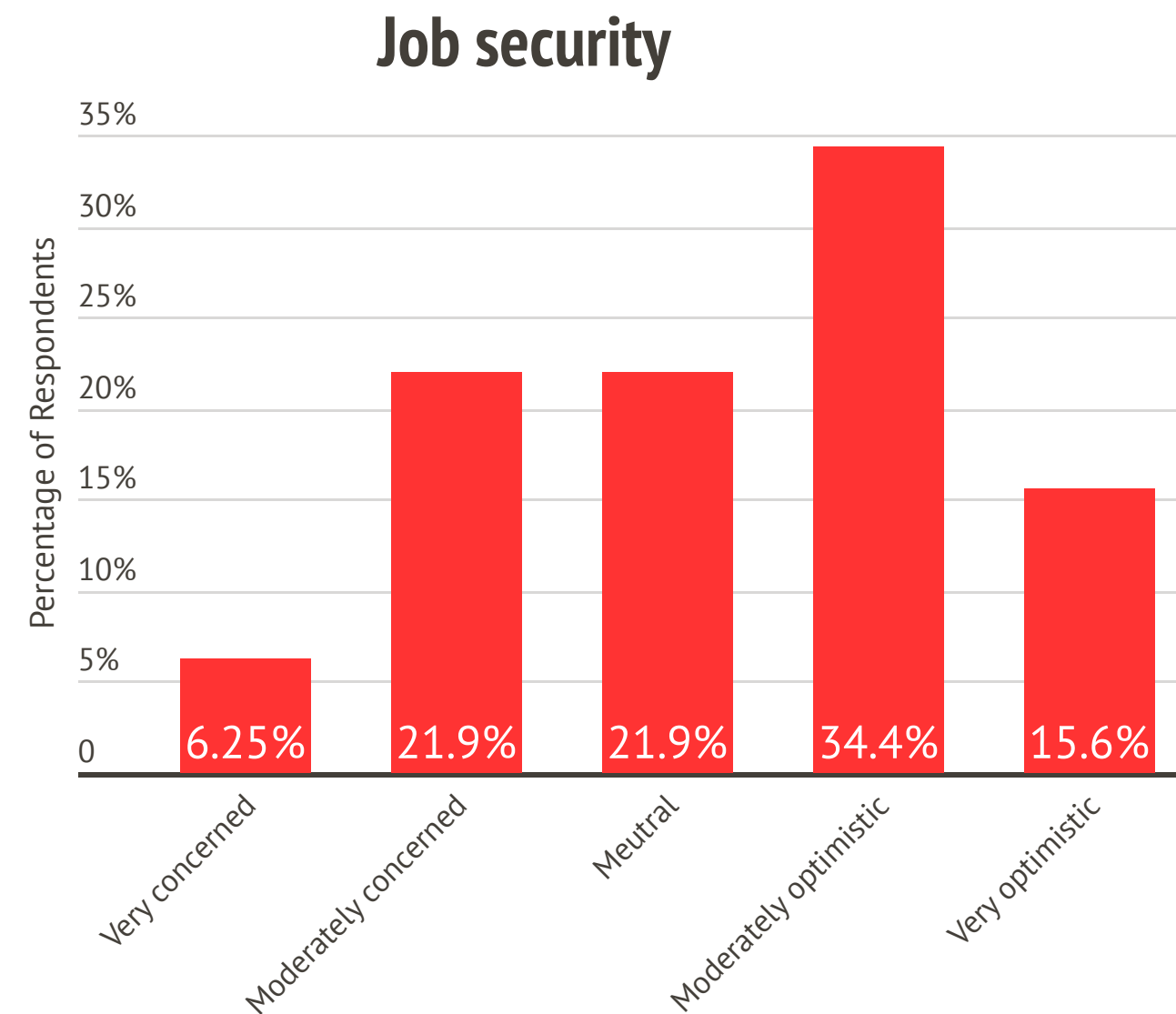
Given the new circumstances that students needed to navigate while finishing their semesters, Waterloo offered students the ability to report their marks as credit/no credit. Almost half (**49%**) took advantage of this opportunity to apply CR/NCR for one or more of their courses.





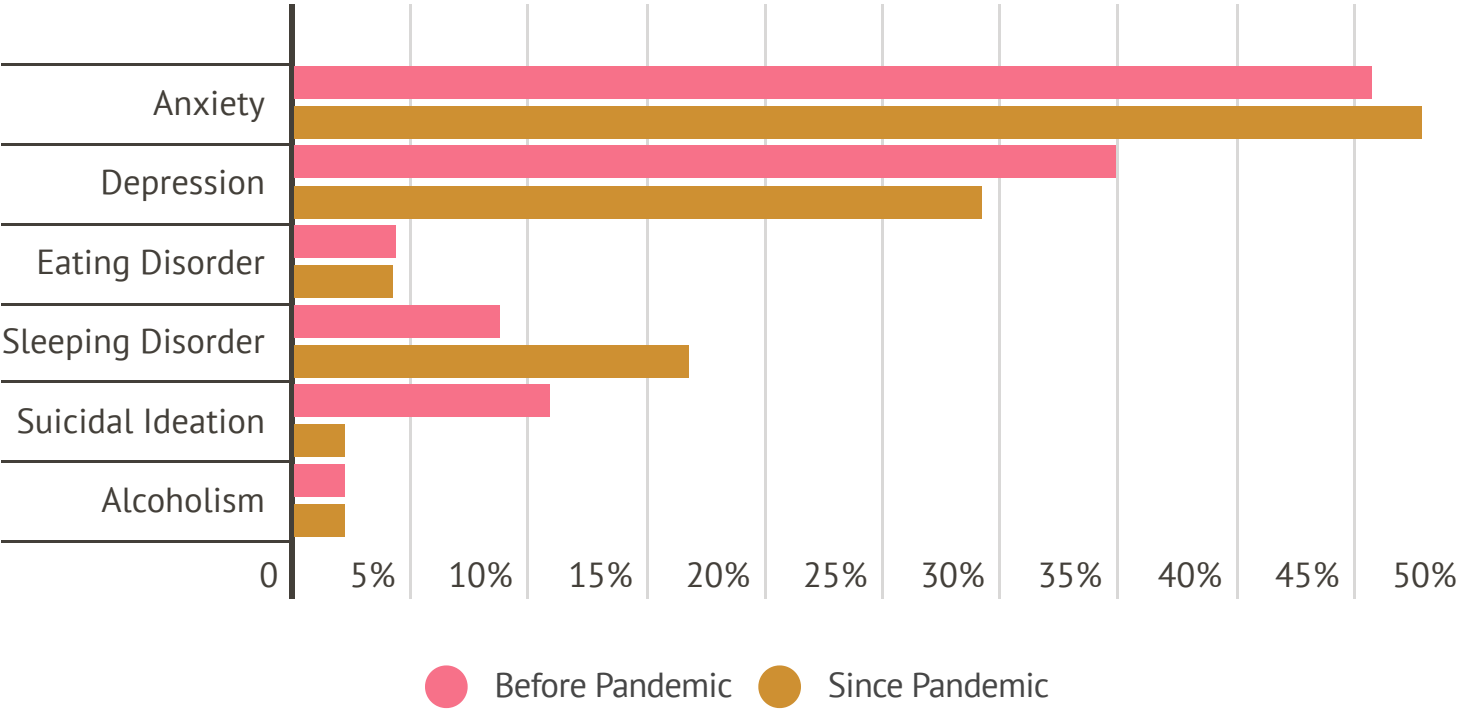
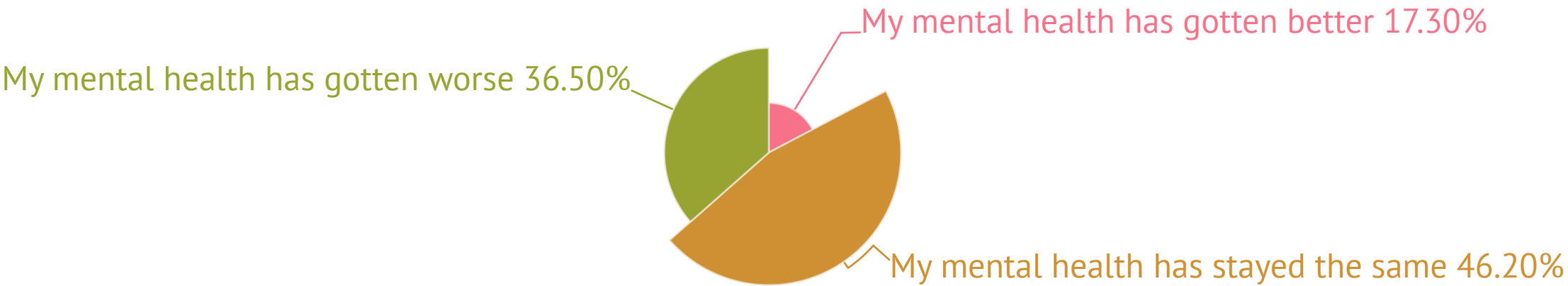
# THOUGHTS ON THE FUTURE

While the class is relatively optimistic towards their job security, the same cannot be said about their sentiments towards job markets.



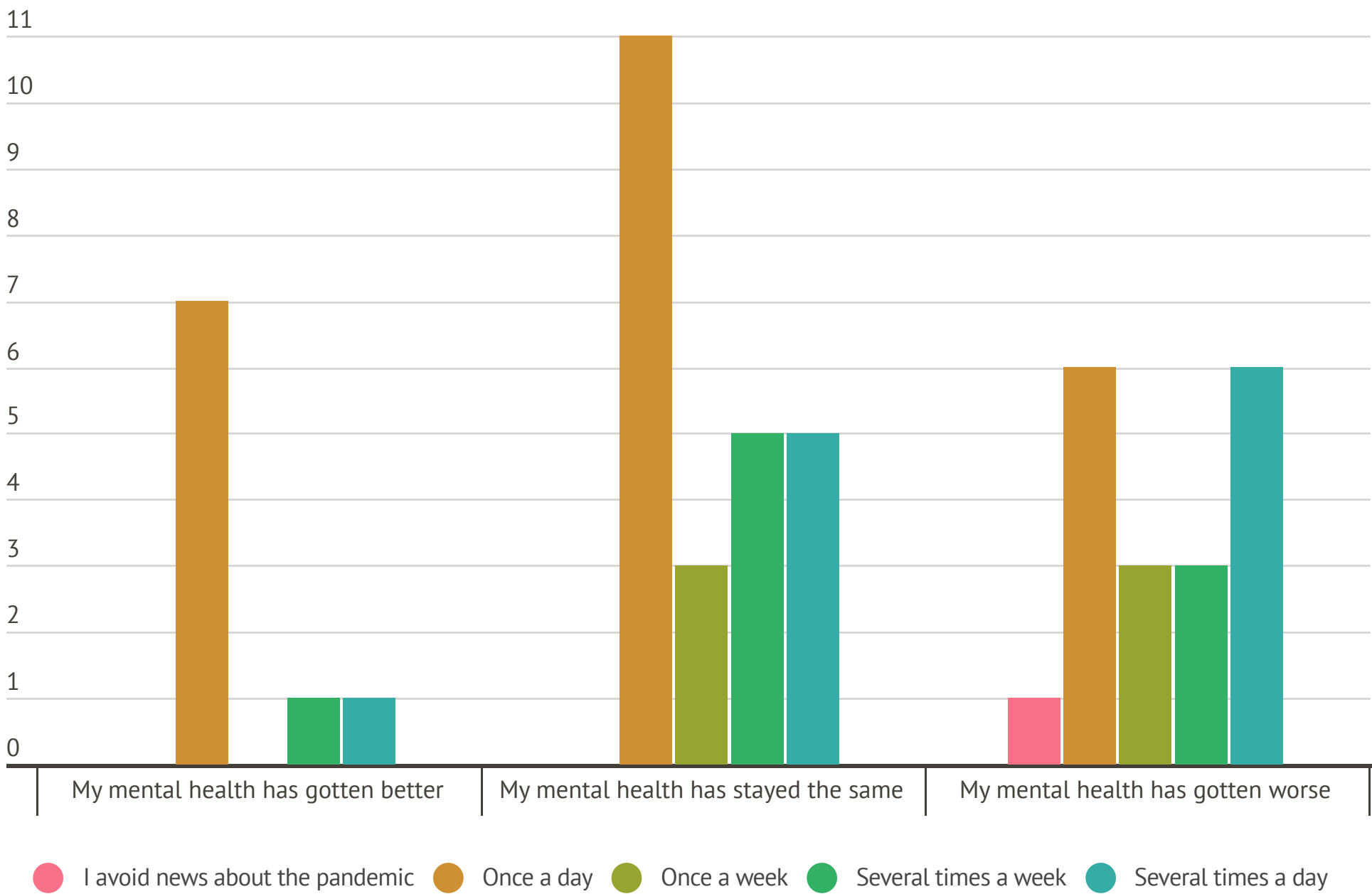
# MENTAL HEALTH IMPACTS

The pandemic affected many factors in students' lives including mental health. **36%** of respondents observed a decrease in their mental health. On the other hand, **17%** experienced an improvement in their mental health. This could be due to many reasons such as being able to move back home or having less school work to manage.



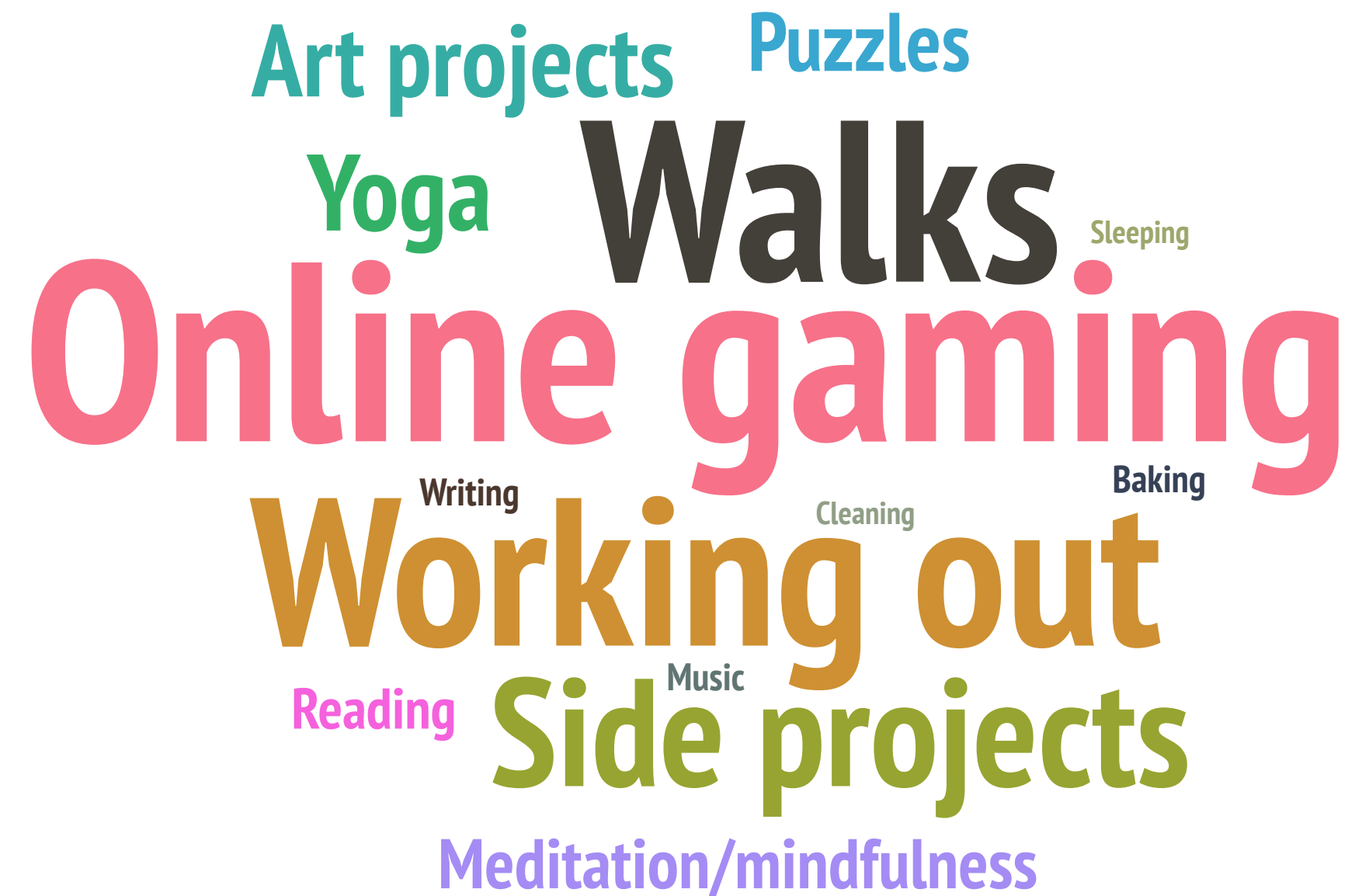
# NEWS CONSUMPTION

Respondents who observed a decrease in their mental health are more likely to report that they stayed informed with the pandemic *several times a day* or *several times a week*. Those who reported an improvement in mental health seem less likely to consume large amounts of news regarding the pandemic.



# HOBBIES

With more time at home, SYDE 2020 has taken the opportunity to engage in new and existing hobbies. Over **60%** of respondents had online gaming and walking as hobbies during this time.



# THOUGHTS

”

**It's made me realize how much I take life outside the house and the presence of other humans for granted.**

family has suffered major crises

**It's allowed me to grow as a person and achieve personal goals I didn't have as much time for**

Less financial worry

”

**Feeling really cut off**

There was no end to university but suddenly it's all over and everything that we have done over the past 5 years has just ended without goodbyes, final things or closure and it makes me feel like we've been cut adrift.

”

I'm actually in a pretty good place from a financial point of view, but I'm worried that it will set me back in my career substantially.

**I'd really like to not have to take whatever job I can get, but I'm starting to think that I've got to take what's left.**

”

**Although I don't get to go on my grad trip or finish the year 'properly', I'm focusing on self improvement.**



# THANK YOU!

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Thank you for taking the time to learn more about the Systems Design Engineering class of 2020! We would also like to extend our gratitude to the previous SYDE cohorts for maintaining the tradition established by the 2017 Systems Design Engineering class. Lastly, thank you to the professors, TAs, department staff, classmates, and a special shout out to Professor MacGregor for helping make the last five years so memorable.

If you have any questions, feel free to reach out!

**[earvin.tio@gmail.com](mailto:earvin.tio@gmail.com)**

**[carras.steph@gmail.com](mailto:carras.steph@gmail.com)**

**[tara.j.yuen@gmail.com](mailto:tara.j.yuen@gmail.com)**