

# GSA Housing Survey Analysis

Christopher Salahub

23/02/2021

## Executive Summary

The GSA/WUSA Housing Survey surveyed a total of 566 graduate students at University of Waterloo. The key findings for overall student trends are

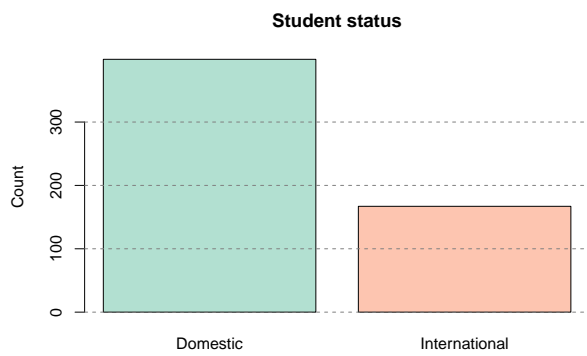
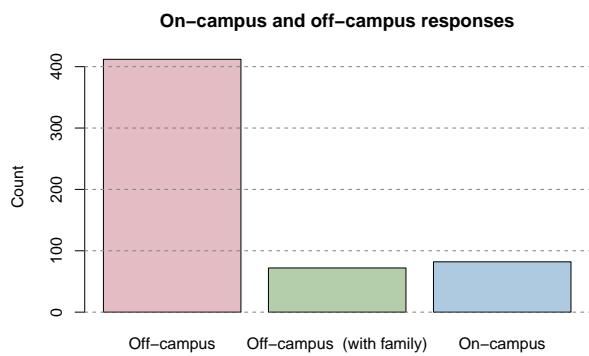
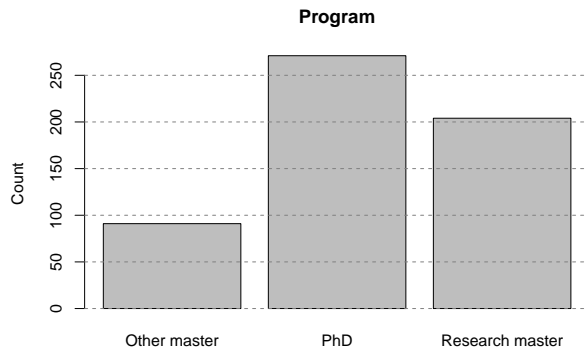
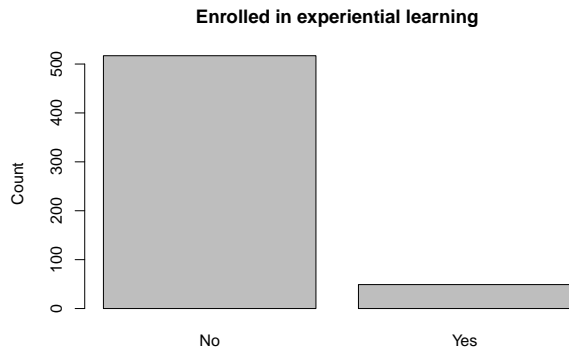
- A majority of respondents rent off-campus in the city of Waterloo
- The most common quality complaints of respondents are pests and water quality
- A majority of respondents report one or fewer quality complaints in a typical residence
- Almost a fifth of respondents report an inability to meet basic needs after affording housing
- A third of respondents required two or more major repairs in their housing in the past
- Most respondents move once per year, commute for less than 30 minutes, and commute by foot or public transit
- A majority of respondents report no use of legal supports
- No pets clauses were commonly reported among surveyed students
- A majority of respondents have signed leases with illegal contracts not recognizing they are illegal
- Roughly a fifth of respondents have resorted to staying with family or couch surfing due to market pressures
- Nearly a fifth of respondents have had concerns over being homeless at some point in their studies
- The primary features students look for in housing are cost, location, cleanliness, and responsiveness to maintenance requests

The key comparative findings are

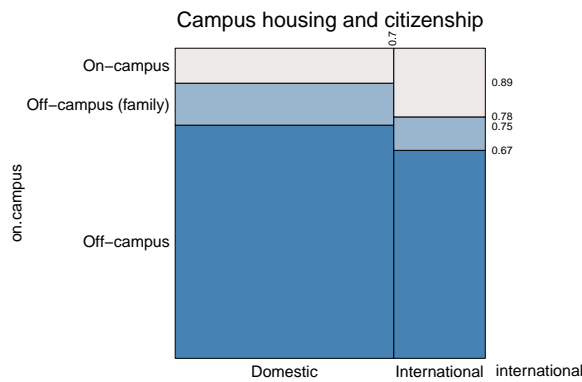
- Respondents in student housing reported more maintenance issues than those in other forms of housing
- International respondents are more likely to report an inability to meet basic needs after paying for housing, spend a larger proportion of their budget on housing, report more discrimination or uncertainty about discrimination, and are more likely to have reported fearing homelessness than domestic students, even when region, type of housing, and program are taken into account
- International students are less knowledgeable about the legality of different clauses, and less aware of local housing resources that they can turn to for support
- Domestic students are much more likely to report reliance on family during housing crises, while international students turn to temporary housing or friends
- The quality of on-campus housing is better than off-campus housing
- The most common quality concern of off-campus students is pests, while that of on-campus students is water quality
- There are indications that graduate students with families face increased budget pressures, but a lack of specificity in this survey hampers further conclusions

## Demographics

Plots which display the demographic responses of the 566 graduate students surveyed are shown below.



Most respondents are domestic students living off-campus and are enrolled in a research-based program. One immediate question of interest is the relationship between campus housing and citizenship, which is explored in the following eikosogram:

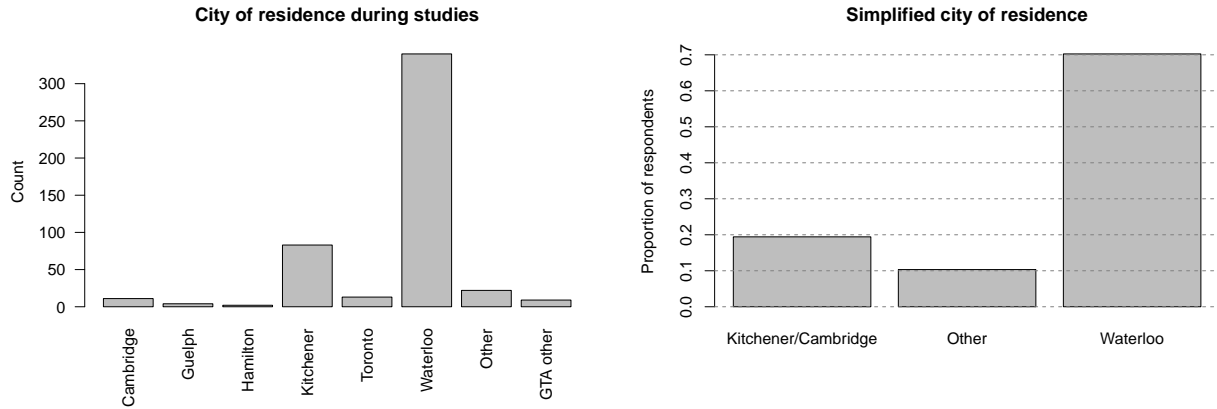


From this, we can see that domestic students are less likely to live on campus, but are slightly more likely to live with family than international students.

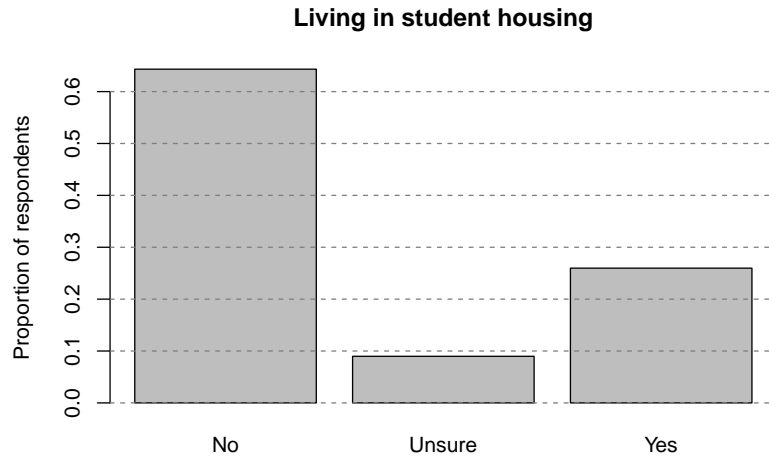
## Housing Demographics

In addition to the direct demographics, students were asked a number of general questions about their living situation during semesters of study at the University of Waterloo. Some of these are of interest when

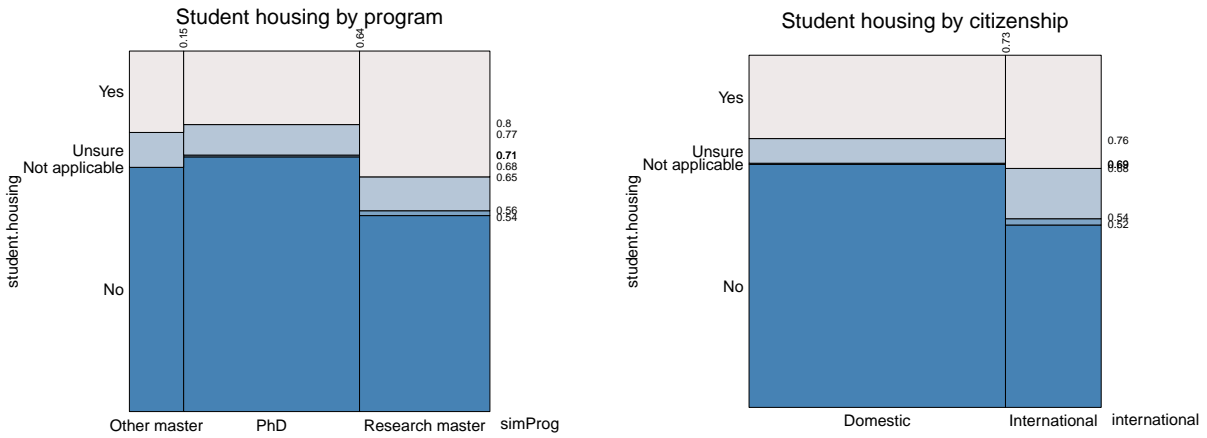
compared with earlier demographic questions, and so in the following these comparisons have been made. First, we can look at the distribution of municipalities reported by respondents.



It is clear that students dominantly choose to live in Waterloo during their semesters of study, with 70% of respondents saying so. Kitchener and Cambridge account for another 20% while only 10% of students live elsewhere. Another key question of interest is that of the proportion of respondents living in housing marketed to and built for students.

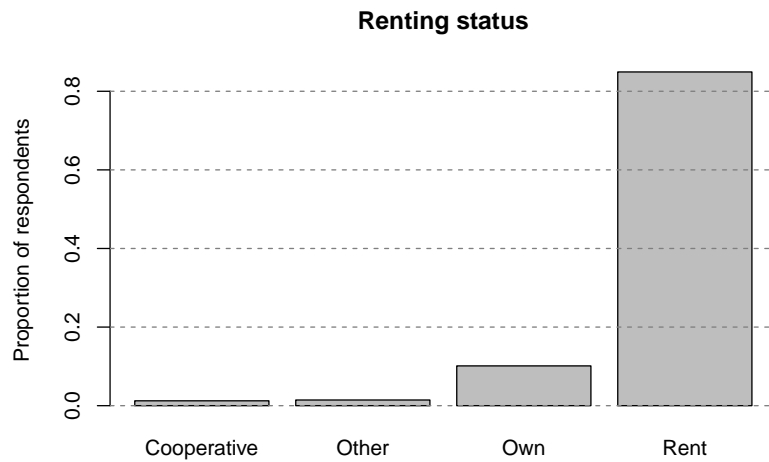


Most students (64%) report living in housing not designed to cater to students, but more than a quarter of students report living in student housing. Moreover, the distribution of this choice is different over different programs and citizenship status levels, displayed in the two eikosograms below:

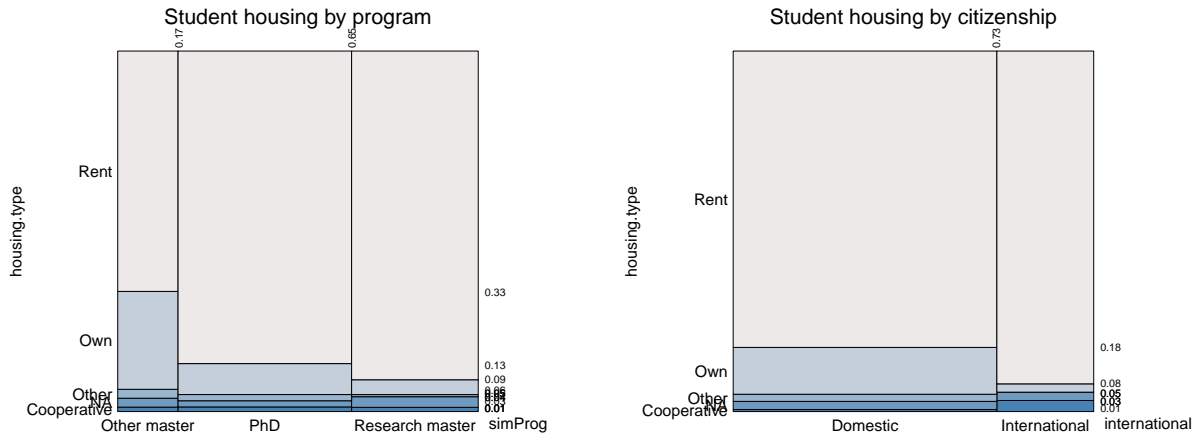


The above eikosograms indicate that research master’s students and international students are much more likely to live in housing which caters to students. In addition, we can see that international students are much more likely to respond with uncertainty than domestic students, suggesting less familiarity with the housing market in the region or less clarity with their particular situation.

We next examine whether students living off-campus rent, own, or live in another housing arrangement.



The dominant response is that of renting, garnering more than 80% of responses. Most of the remainder of respondents own, roughly 10%, with only a small number living in cooperatives or other living arrangements. Breaking this down by citizenship and program:



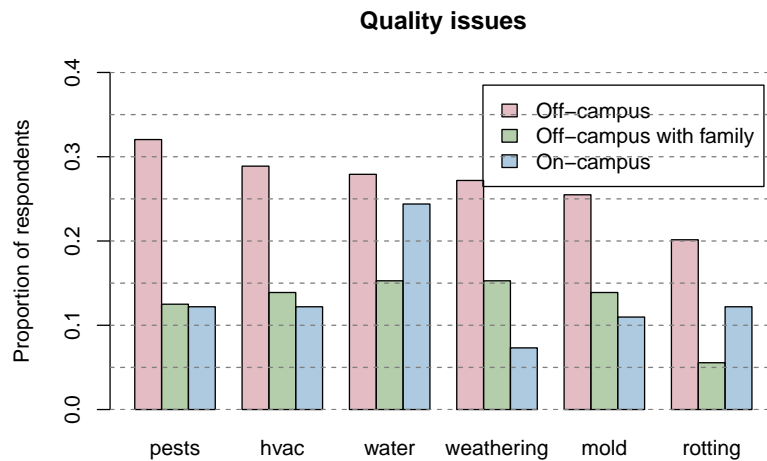
Domestic students and students in other master's programs are the most likely to own their housing, and international students and research master students are the most likely to rent.

## Satisfaction

Students were next surveyed on their satisfaction with different aspects of their housing. First, students were surveyed on a number of common maintenance issues, namely

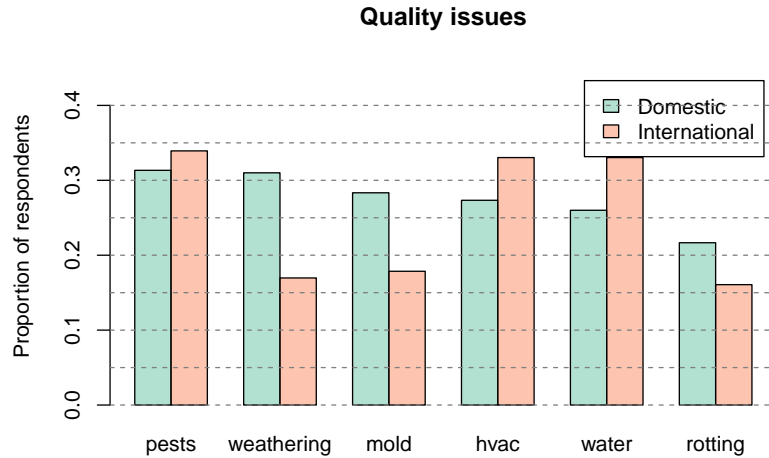
- the presence of pests such as cockroaches
- problems with heating and ventilation
- poor water quality
- cracks and weathering on the exterior of the unit
- mold or mildew
- evidence of damaged or rotting building materials

The proportion of respondents reporting each issue are shown in the bar plot below, separated by whether they live on campus.



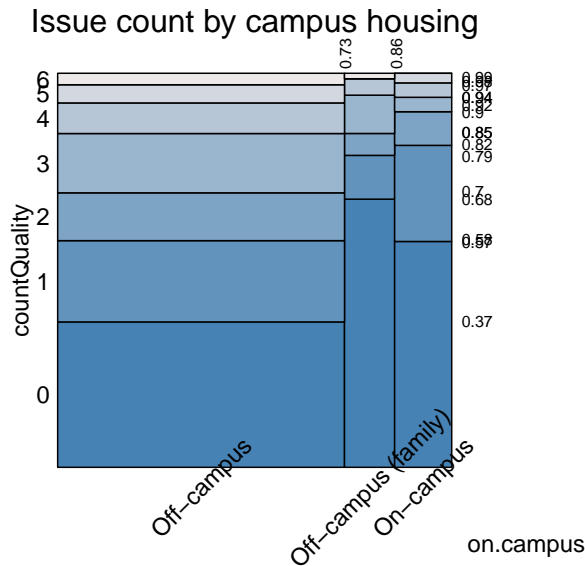
The most striking part of this plot is the generally positive quality of on-campus housing compared to off-campus housing. For every single quality complaint, on-campus housing performs better than off campus housing. Students indicating another maintenance issues (44 responses) reported broken appliances (11 responses) and plumbing issues (9 responses) most frequently.

Instead of splitting these quality problems by housing type, we might instead view the gap between domestic and international students:



The increased prevalence of weathering, mold, mildew, and rotting in domestic students in this plot suggests that domestic students tend to choose older housing than international students. Regardless of the students however, it seems pests and vermin are the most common quality issue encountered.

We can translate the above to view the number of quality issues encountered by students by counting how many of the above a respondent selected. A comparison of these counts to whether they live in on campus housing is displayed in the next eikosogram.



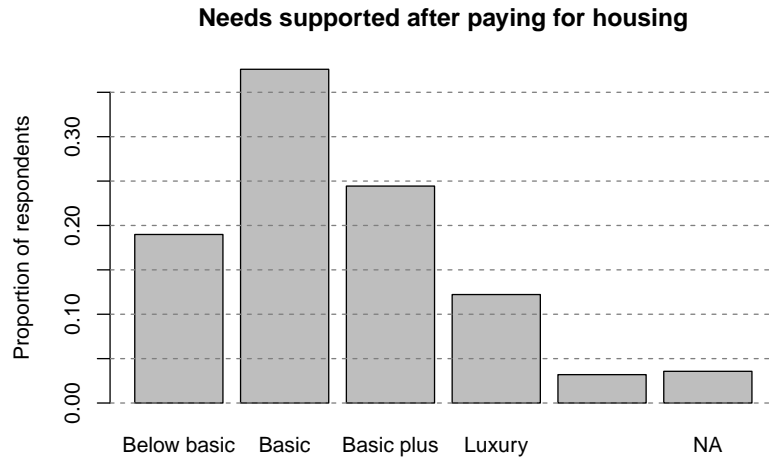
More than half of on-campus housing students indicated no quality complaints whatsoever, compared to only a third of off-campus students. On-campus housing is clearly superior in quality to off-campus housing on average if these quality reports are to be believed.

The next question asked students to report at what level they are able to meet their needs after accounting

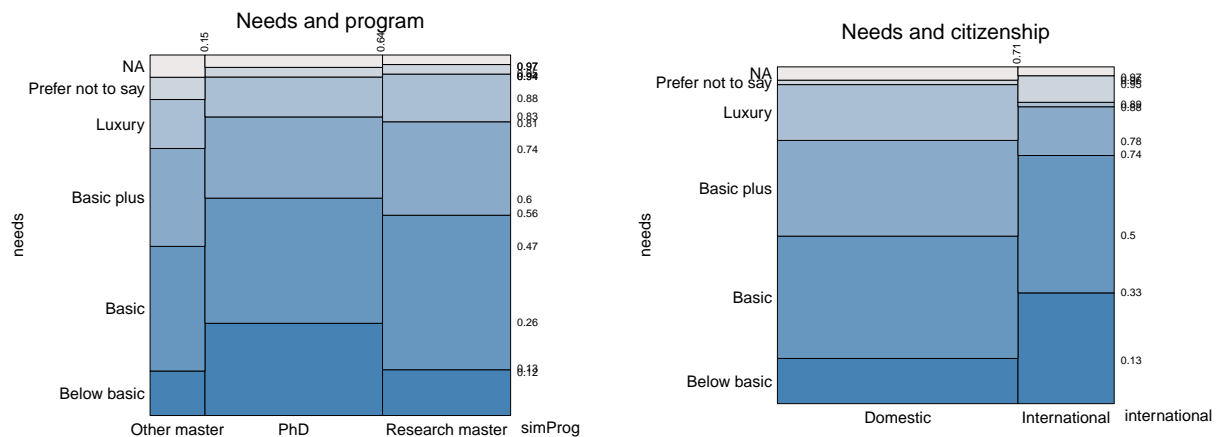
for housing costs, with options

1. not applicable
2. prefer not to say
3. more than enough funds to meet basic needs, unanticipated expenses, and luxury items
4. enough funds to cover basic needs and unanticipated expenses
5. enough funds to just cover basic expenses
6. insufficient funds to cover basic expenses.

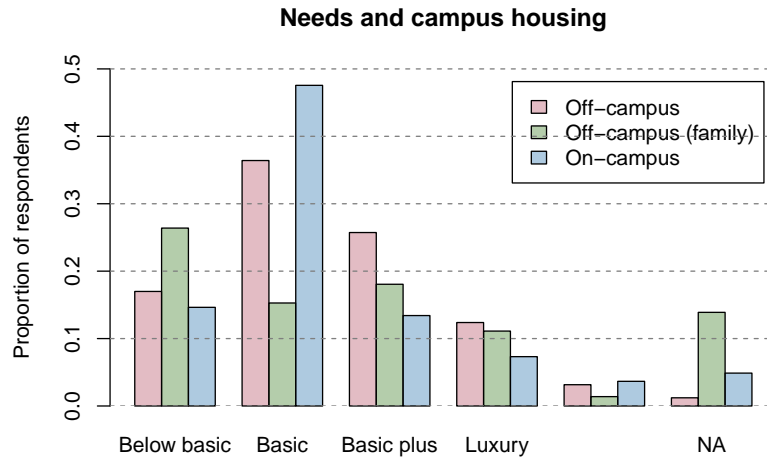
At a coarse level, the responses were



While most students (70%) report meeting or exceeding their basic needs, roughly one quarter of respondents report failing to meet their basic needs after paying for housing. Further analyzing these responses by their program and citizenship



What is most striking about these responses is the gulf between domestic and international students. While only 13% of domestic respondents reported failing to meet their basic needs after paying for housing, the proportion was one third for international students. We can construct a bar plot of the same data by whether students live on campus.

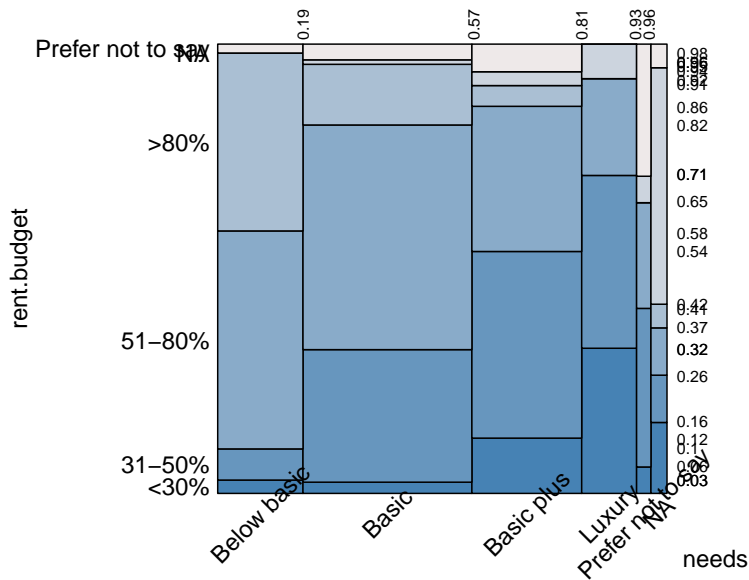


We can see here that the on campus respondents are the least variable in their responses: a large plurality are affording a basic quality of life after funding their housing while off campus students are more variable in their responses. They most commonly report that they have enough money to meet their basic needs after paying for housing. Finally, we can see that respondents living with family tend to split into two groups: either reporting that the question doesn't apply to them or that they fail to afford basic needs. This split suggests that this response was not specific enough to the situations of students. While the question was designed to target students living with their parents while studying, this variation in responses suggests that student parents with their own families may have also selected this option.

In any case, these findings must be interpreted cautiously. We have done nothing to control for the interrelationships of student citizenship, on campus living, and program. For more precise and controlled evaluations, see the modelling section.

A related question to that of money left to meet needs after paying for housing is the proportion of respondent budget going towards rent. Indeed, comparing these two responses with an eikosogram we can see a clear correspondence between the two.

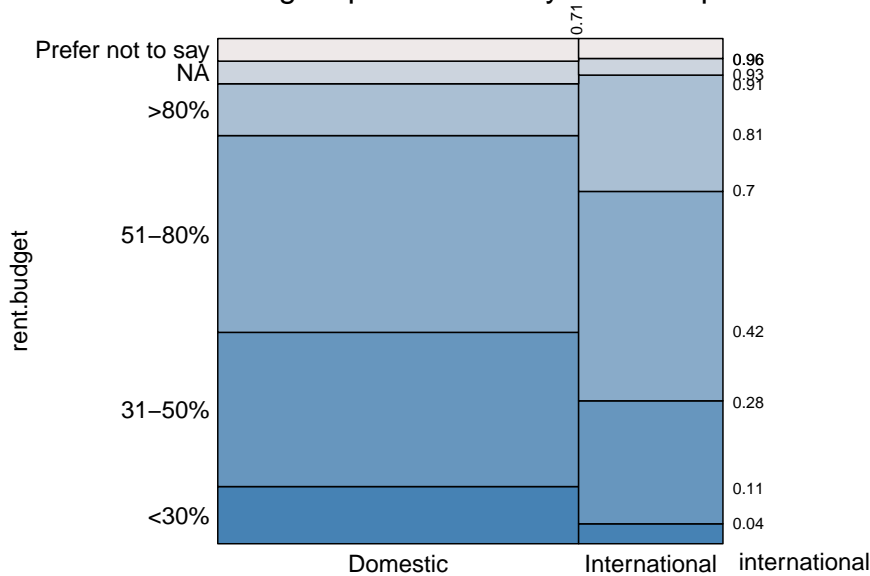


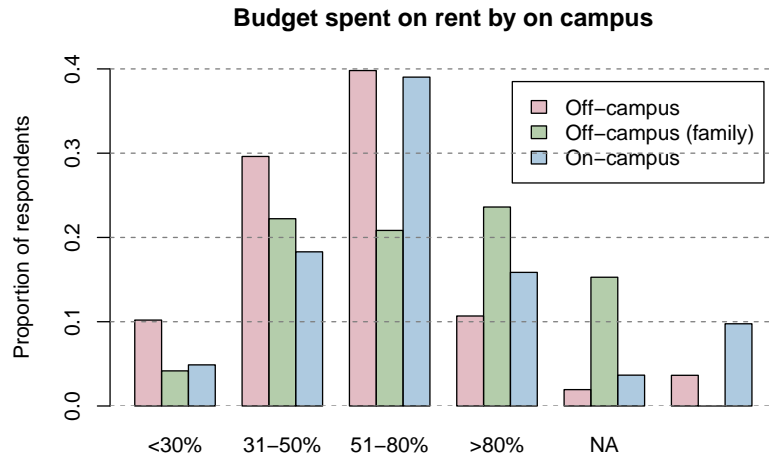


This eikosogram also points to an important distinction between these two questions. First, our ignorance of the budget of respondents means we do not know what the reported percentages correspond to in dollar amounts. Someone with a small income and cheap rent may still have difficulty meeting basic needs after paying for rent. Second, despite suggestions as to what constitute “basic” needs in the question prompt, there is a degree of subjectivity in a respondent’s evaluation of their own quality of life. Nonetheless, we can clearly see that respondents spending less of their budget on rent are more likely to have more than enough money to meet their basic needs.

With that in mind, a number of the relationships we find with further eikosograms are unsurprising.

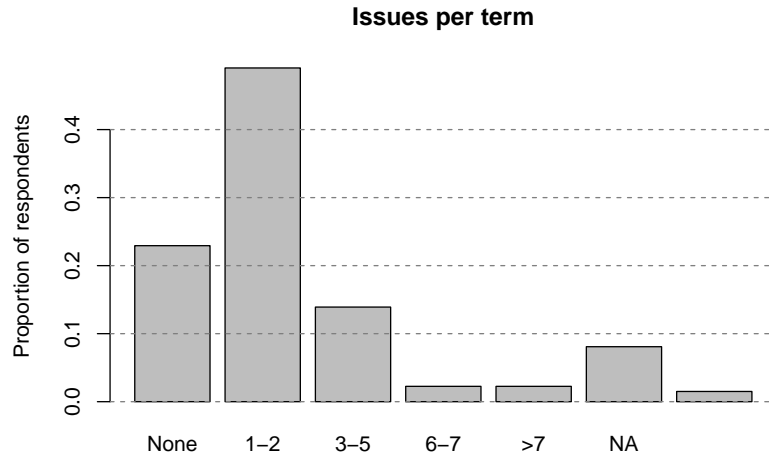
### Budget spent on rent by citizenship



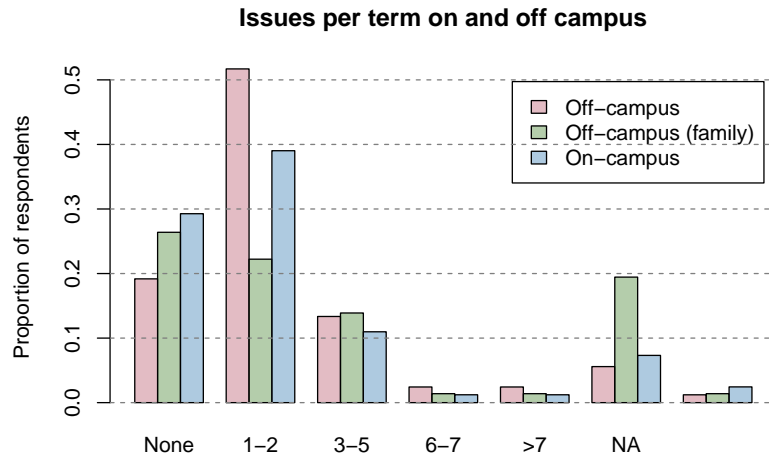


Domestic students are more likely than international students to spend less than 50% of their budget on rent (42% to 28%), and the same variation in responses noted for off campus student living with family is present here, suggesting a combination of students living with parents or older relatives and those living with their own families.

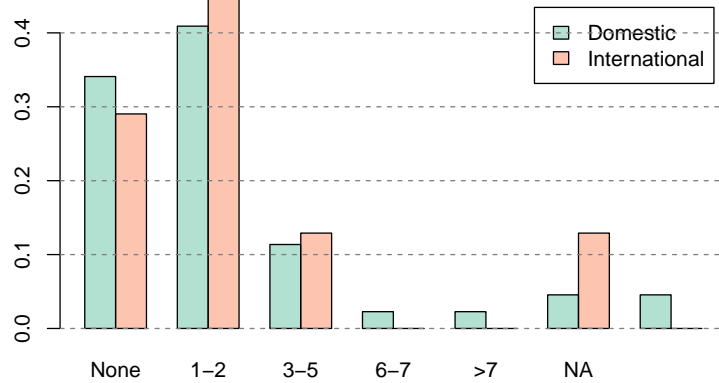
Students were next surveyed on the number of maintenance issues they experience per term. The broad summary indicates that roughly half of students experience one or two maintenance issues every semester, and less than a tenth experience more than five.



Splitting this by whether students live on or off campus, we see that the same conclusion as earlier splits is supported. Students living on campus were more likely to report no maintenance issues than those off campus, and were less likely to experience more than one issue in a semester. In addition, we see that students living with family are less likely to report maintenance issues than other off campus students.

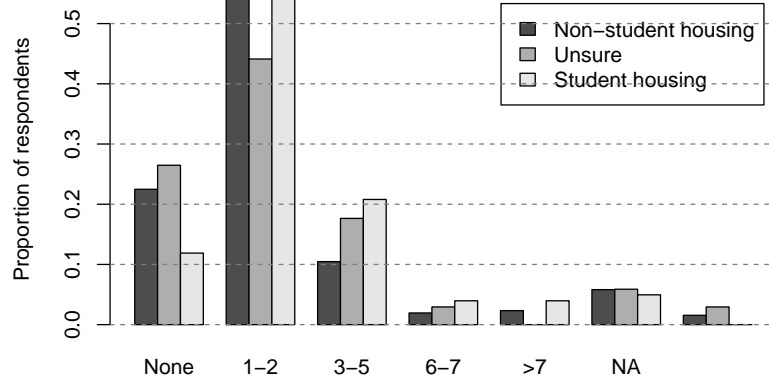


Splitting by citizenship, we see no large differences between domestic and international students.



Finally, we can split by the type of housing: student targeted or otherwise.

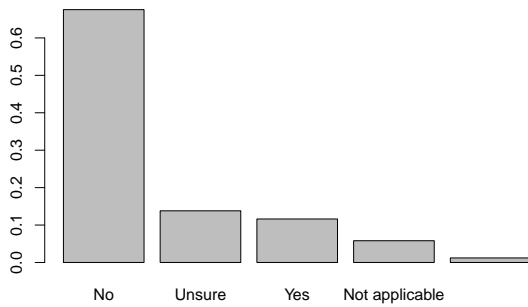
**Issues per term by student housing**



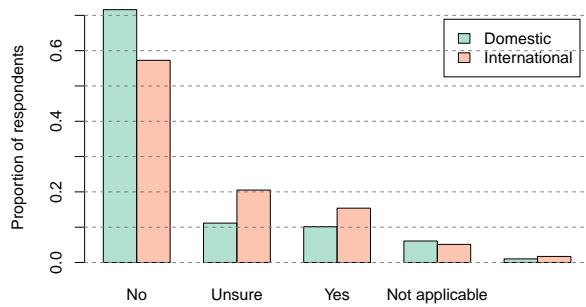
The above plot indicates that students living in student-targeted housing typically face more issues per semester than those living in housing that is not marketed and built for students, with a larger proportion of respondents facing 3 or more issues per term in student housing.

Discrimination was also addressed in this survey. While no racial information was collected, data from previous surveys done by the GSA has indicated that citizenship is related to student race, and so the most relevant split to investigate the nature of this discrimination is to view the difference in reports between domestic and international students. Note that the displays below were filtered to only the responses in the Waterloo Region, where the GSA has more political power,

**Experienced Discrimination (Waterloo Region)**

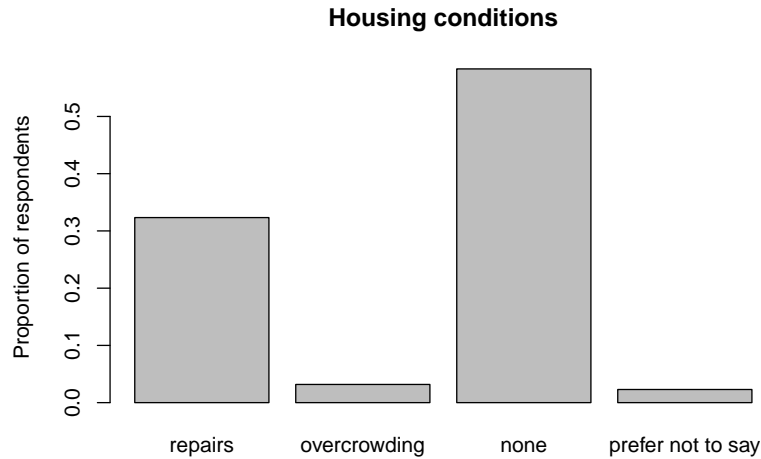


**Discrimination by citizenship (Waterloo Region)**

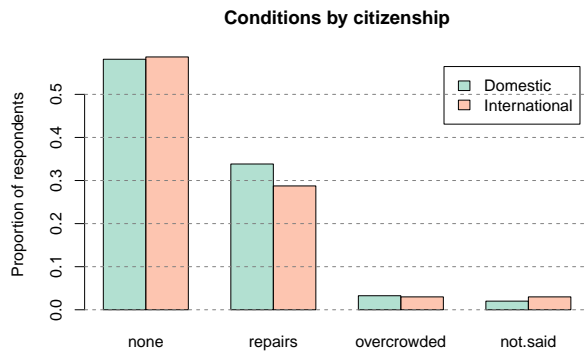
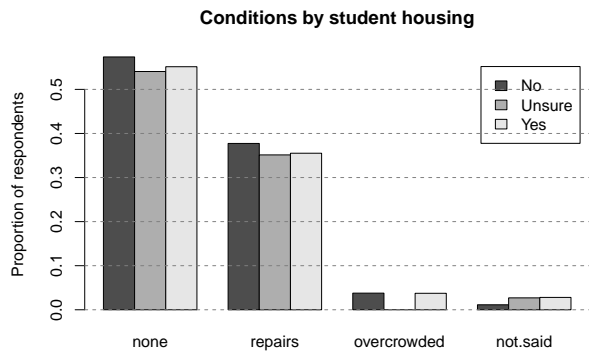


The bar plot displaying this split suggests that the majority of both domestic and international students experience no housing discrimination. For both groups, a similar proportion report discrimination, 10% for domestic students and 15% for international students. International students, however, were twice as likely to indicate uncertainty over whether they had been treated in a discriminatory manner.

The final question in the student satisfaction section concerned two particular housing complaints which are used to class housing as inadequate: that the housing requires two major repairs and that the housing is overcrowded.

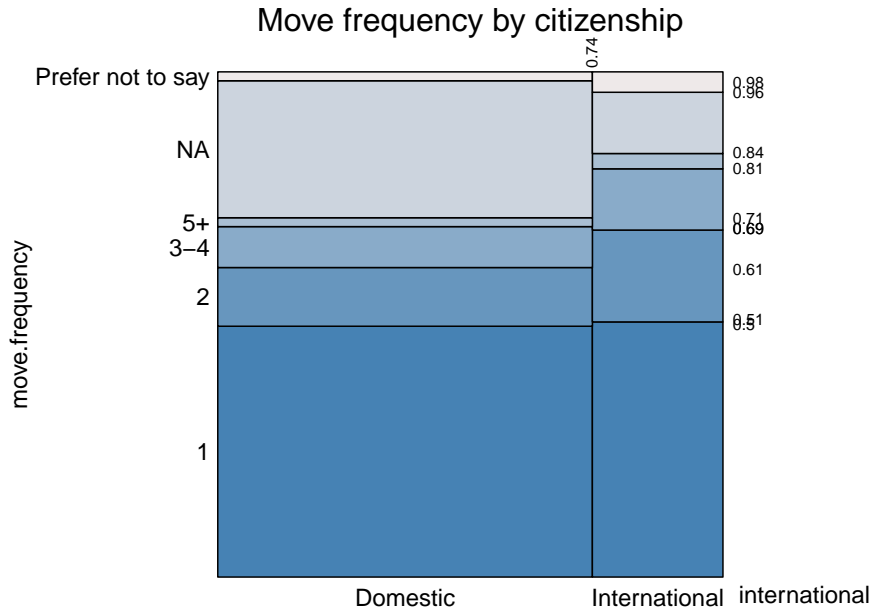


Roughly one in three students indicated that they have lived in housing that required two or more major repairs, one of the definitions of inadequate housing. Some caution ought to be exercised here, as the legal definition of “major” can easily be thrown into question. That said, this suggests a large number of students live in housing which required two repairs and so may be of poorer quality, the definition of “major” notwithstanding. Neither student housing nor citizenship seemed to have any relation to this rate, with the patterns identical for both student and non-student housing and domestic and international students.



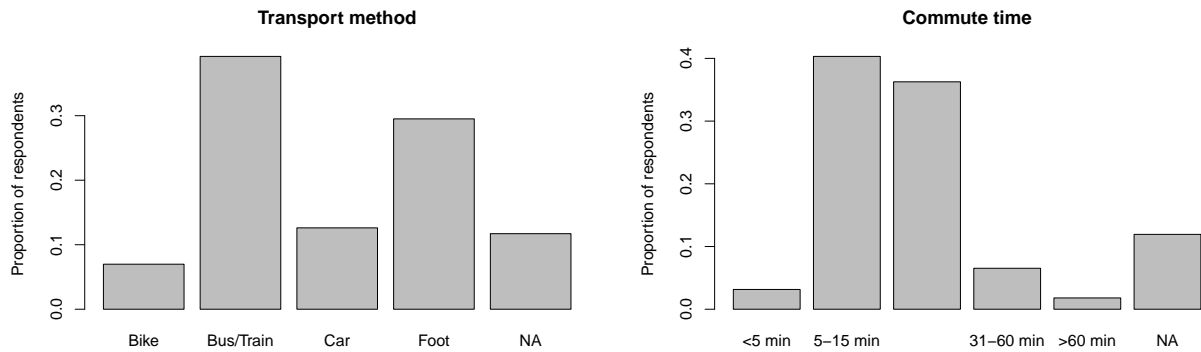
## Student behaviour

The next section addressed student choices rather than student experience with housing. First, students were asked how often per academic year they move. An eikosogram displays the responses for international and domestic students.



While most students report moving only once per year, domestic students were much more likely to report that this question was not applicable to them, suggesting they live in a setting for which new housing is unnecessary. Perhaps this is due to familial support, but as this was a conditional question asked only of off campus students, we cannot determine that with any greater detail.

Next, students were asked about their daily commute. Both the method of commute and the length of the commute were asked of students, and the following bar plots display the distribution of responses. The “NA” responses here correspond to students that have not yet commuted due to a start date in 2020 for their program.

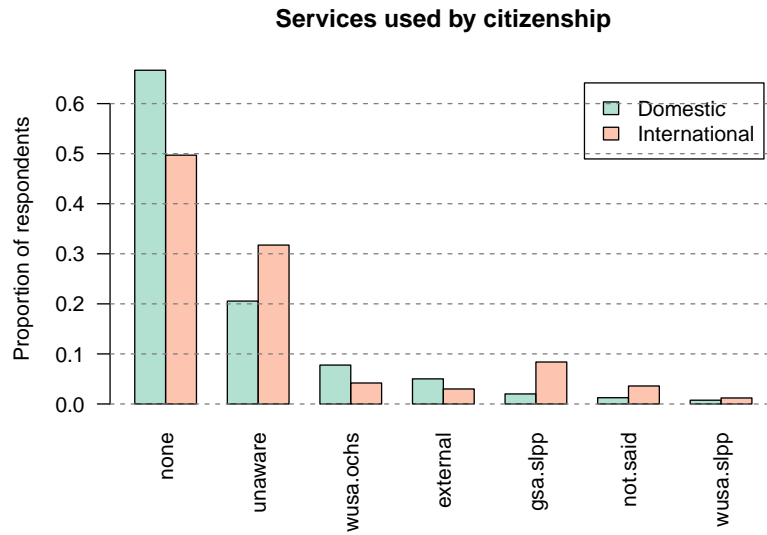


The largest portion of students take the bus or train or go by foot to campus, and commute for less than half an hour.

Students were also asked about their utilization of different legal services meant to assist them, in particular:

1. WUSA Off Campus Housing Service
2. External services (e.g. Waterloo Region Community Legal Services, the Region of Waterloo Renters Toolkit)
3. GSA Student Legal Protection Program
4. WUSA Student Legal Protection Program

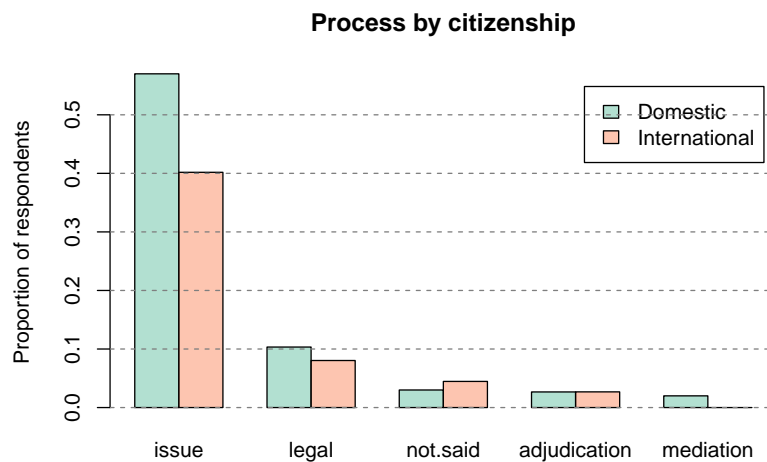
Splitting the usage by citizenship:



We can see two things. First, that a majority of students are simply not utilizing any of the above services, and second that there is a knowledge gap between domestic and international students, with the latter much less likely to be aware of the different legal services available to them.

Further, we can see how many students actually pursue different procedures, such as legal action, due to housing. In order, the options provided were

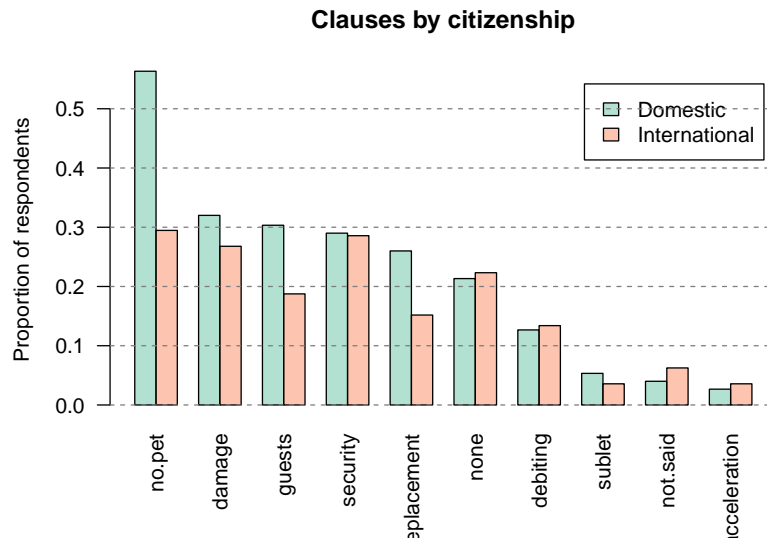
1. Discussion to resolve an issue
2. Consultation with legal council or a housing advocate
3. Adjudication
4. Mediation



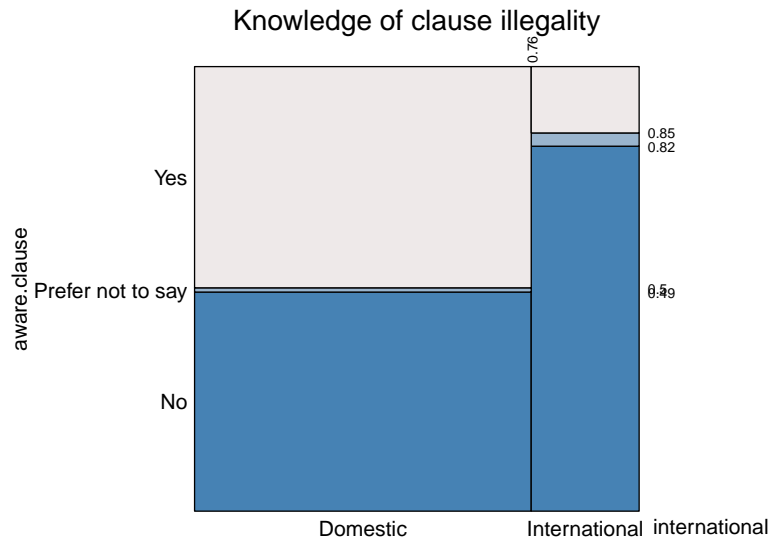
We can see that the dominant process that students have used to address concerns with their landlords is the discussion of issues. However, despite similar housing quality responses for both citizenship groups, international students are much less likely to report pursuing these conversations.

Students were next asked to indicate which of the following illegal clauses they have ever signed on a lease:

1. No pets
2. Charging a damage deposit
3. Prohibiting overnight guests or limiting the maximum number of tenants
4. Asking for more than a month's rent for the security deposit
5. Charging more than cost for the replacement of keys
6. Requiring direct deposit or automatic debiting
7. Subletting a unit for higher than the rental cost
8. Acceleration clauses



By far the most common illegal clause is the prohibition of pets. We can see, however, that domestic students are more likely to have signed leases with illegal clauses, in particular those restricting pets. This emphasizes the slightly different markets domestic and international students search to find housing. This gap in clause occurrence is nothing in comparison to the knowledge of the clause illegality, however.



There is a clear knowledge gap here. International students are far less likely to recognize illegal clauses than domestic students. For those that did recognize the illegality of clauses, comments indicate that irrelevance (e.g. due to not owning or planning to get a pet), the pressure of competition, and knowledge that the illegal clauses would not be enforceable were the primary reasons why students signed on to contracts with illegal

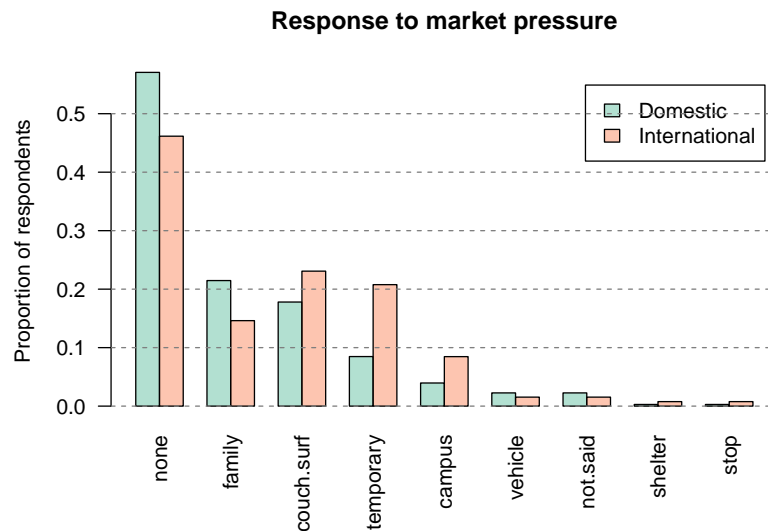


clauses.

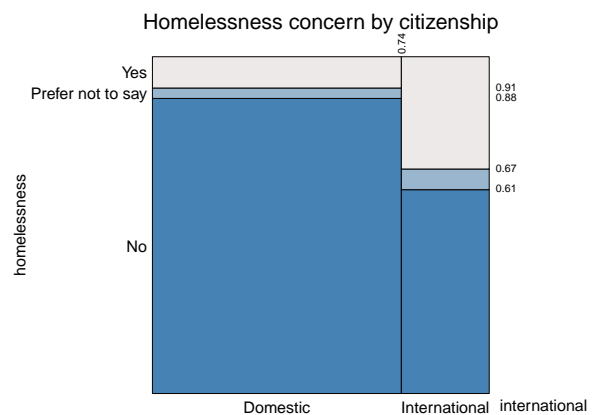
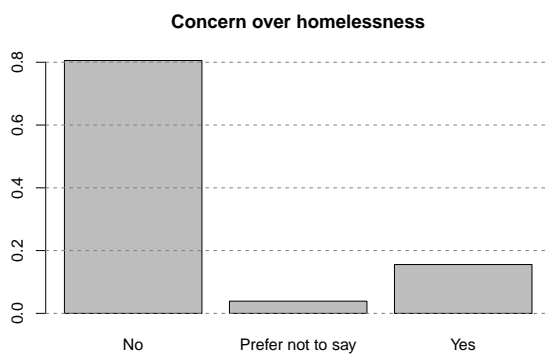
## Stressors

The final section of the survey addressed housing stresses experienced by students. The first question in this section asked about student responses to a competitive and limited housing market. The options provided were

1. Forced to stay with family or a partner
2. Couch surf or stay with friends while between housing
3. Live in temporary housing (e.g. Airbnb, hotel, motel)
4. Forced to sleep on campus
5. Forced to sleep in a vehicle
6. Access an emergency shelter or housing
7. Stop school

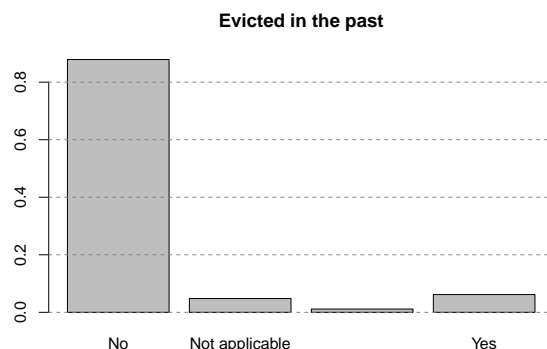


While most students thankfully responded that they had not faced any of these circumstances, there are key differences of note. First, we can see that international students are more likely to have faced one of these circumstances over their studies. Next, the responses of international students, that of temporary housing, couch surfing, and staying on campus, suggest less robust support networks for these students to fall back upon while searching for housing.



This lack of local support and local knowledge is displayed again in the greater anxiety international students have over homelessness. While less than 10% of domestic students have had concerns over homelessness during their studies, roughly a third of international students have had these concerns.

Following the question over homelessness concerns, students were asked a few questions on eviction. First, students were asked if they had ever been evicted.



The vast majority of students have not experienced eviction, indeed only 27 students responded yes to this question. The following two questions, relating to eviction for a family member, had five and two affirmative respondents respectively. As a result, no further analysis was pursued. The small sample size means that the additional questions on eviction or further splitting produces dubious sample sizes.

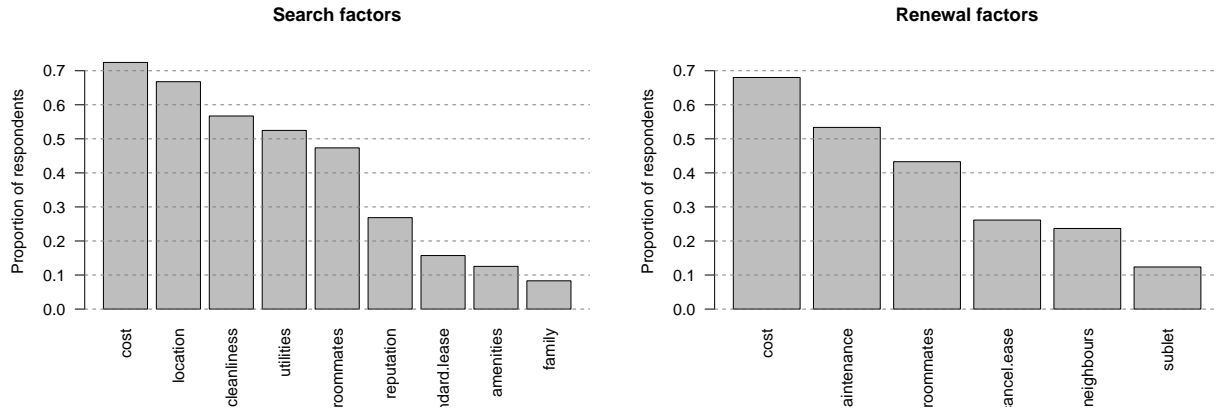
Students were also asked about the factors that impact their search for housing and choice to renew a lease. The different search factors listed were

- cost
- location
- cleanliness
- inclusion of utilities
- number of roommates
- reputation of housing provider
- use of a standard lease by landlord
- included amenities (e.g. gym, study rooms)
- space for family

In addition, respondents were allowed to provide their own other option, in which space for and allowance of pets were the most common search factor. The renewal/extension features listed were

- cost
- history of maintenance issues
- roommates
- ease of lease cancellation
- neighbours
- ease of subletting

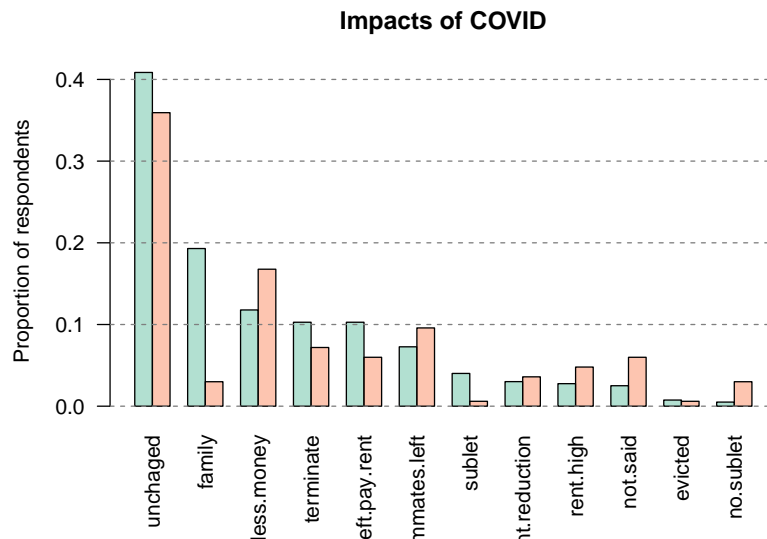
A free-form other option was also provided, in which the inconvenience and effort of moving were a common factor. The responses to both questions are displayed below



Note that the ordering and prevalence of these factors was consistent across different subgroups of students. We can see that cost concerns are dominant both in the search process and in the decision to extend a lease. When searching for housing, location is another key factor respondents consider. In addition, factors to do with ease of living such as maintenance history, inclusion of utilities, and cleanliness were commonly selected by students.

Finally, the impacts of COVID on student housing were investigated. Students were asked if COVID had impacted their housing situation by

- moving in with family
- reducing the money they have for non-shelter expenses
- resulting in a lease termination
- paying rent despite moving out
- causing their roommates to leave
- allowing them to arrange a sublet
- causing a negotiated rent reduction
- causing rent to increase
- leading to eviction
- interrupting a planned sublet



Once again, we can see that more students than not have remained in the same housing with no change since the start of COVID. Importantly, however, international students have been more likely to experience a change, and have been much less likely to move in with family. In addition, they are more likely to report

having less money for non-shelter expenses due to the pandemic. This plot speaks to a theme present in many other comparisons of domestic and international students: that of the precariousness and lack of knowledge and support international students face relative to domestic students.

A survey of the suggestions for GSA action given by respondents emphasizes this. Common themes were a desire for advocacy and more support through workshops and public resources, perhaps organized with non-university community groups. Other ideas of particular interest included providing support for students to find roommates. Less concretely, the most common suggestion was that the GSA reduce the cost of living in Waterloo, without any suggested plan to accomplish this.

## Modelling

In all of the above analysis, there has been a lack of control for related variables. That is, we have done nothing to separate the impact of any of these demographic variables from each other when viewing a particular aspect of the student housing experience. Many of these variables, for example program and citizenship, are known to vary with each other, and this confounding in the above explorations limits conclusions.

With that in mind, three key aspects of the student housing experience were examined in more detail: homelessness, the ability to cover basic needs, and the number of quality issues experienced. For each of these, generalized linear models were constructed according to the type of data expressed.

The benefit of linear modelling is that it allows us to separate, to some extent, the impact of one variable from others. It allows for impacts to be assessed independently and so reflects more accurately the ‘true’ effect of one variable. The nature of this survey and its responses means that we still must treat these models as exploratory. Rather than accepting these controlled comparisons as fact, we must accept their conclusions only cautiously.

First, there is a need to decide which variables we should use as predictors and which variables to predict. Due to their core implications for security, sustainability, and quality of housing, the three predictors chosen were student fears of homelessness, the failure to meet basic needs after paying for housing, and the count of quality issues experienced. As predictors, we would like to discern the impacts of type of housing, type of student, and student location. Consequently, student program, citizenship, whether they rent, the region they live in, and whether they live on campus or in student housing were all included.

Model summaries are displayed alongside dot and whisker plots which show the coefficient estimates as points and their confidence intervals as lines. A thick reference at zero is added to improve readability and dotted lines at every unit above and below for scale. Positive coefficients indicate that a particular variable value increases the variable being predicted, while negative coefficients indicate the opposite. By the nature of these models, all coefficients are defined relative to a base level: a combination of variables defined implicitly.

The first model fit was a logistic regression model in which fear of homelessness was predicted by the program, citizenship, and housing type variables. It should be noted here that this question was not asked of on-campus students. The reference level (as for all models) is that of a graduate student renting off-campus with family in Waterloo and pursuing a PhD. The model summary and dot plot below tell a very clear story.

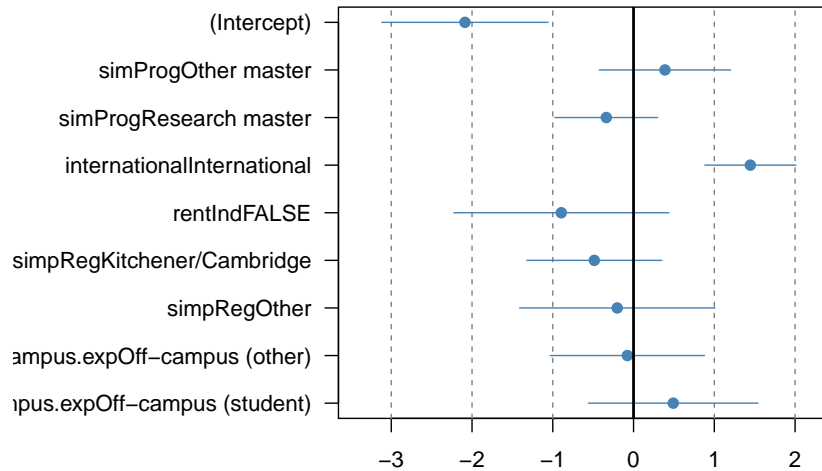
```
##
## Call:
## glm(formula = homeInd ~ simProg + international + rentInd + simpReg +
##      campus.exp, family = binomial, data = housing)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -1.1146  -0.5199  -0.4119  -0.3137   2.5682
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -2.08712    0.52532  -3.973  7.1e-05 ***
```

```

## simProgOther master          0.38897    0.41511    0.937    0.349
## simProgResearch master      -0.33727    0.32537   -1.037    0.300
## internationalInternational    1.44604    0.28791    5.023  5.1e-07 ***
## rentIndFALSE                 -0.89468    0.67917   -1.317    0.188
## simpRegKitchener/Cambridge  -0.48605    0.42622   -1.140    0.254
## simpRegOther                 -0.20203    0.61766   -0.327    0.744
## campus.expOff-campus (other) -0.07631    0.48789   -0.156    0.876
## campus.expOff-campus (student) 0.49150    0.53563    0.918    0.359
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 377.84  on 436  degrees of freedom
## Residual deviance: 335.07  on 428  degrees of freedom
## (129 observations deleted due to missingness)
## AIC: 353.07
##
## Number of Fisher Scoring iterations: 5

```

**Homelessness Concern Coefficients**



When all other factors are controlled, the only statistically significant predictor of fear of homelessness is the citizenship of a student. This bolsters the above explorations and makes the precariousness of international students at UW clear.

The next model attempted to use these variables to explain students reporting an inability to meet basic needs after paying for housing costs. Again, a logistic regression model was fit on the response “Below Basic” for the housing needs question. The reference level here is the same as before, but now instead of students living with family off-campus, the reference level is on-campus students.

```

##
## Call:
## glm(formula = basicNeeds ~ simProg + international + rentInd +
##      simpReg + campus.exp, family = binomial, data = housing)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max

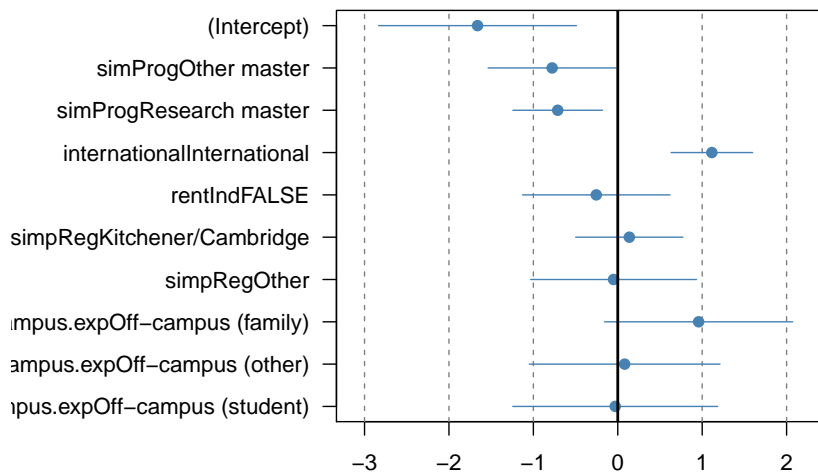
```

```

## -1.3562 -0.6513 -0.4685 -0.3855 2.3491
##
## Coefficients:
##
## Estimate Std. Error z value Pr(>|z|)
## (Intercept) -1.66116 0.59821 -2.777 0.00549 **
## simProgOther master -0.77767 0.38704 -2.009 0.04451 *
## simProgResearch master -0.71165 0.27112 -2.625 0.00867 **
## internationalInternational 1.11456 0.24653 4.521 6.16e-06 ***
## rentIndFALSE -0.25483 0.44557 -0.572 0.56737
## simpRegKitchener/Cambridge 0.13685 0.32425 0.422 0.67299
## simpRegOther -0.05002 0.50136 -0.100 0.92053
## campus.expOff-campus (family) 0.95774 0.56830 1.685 0.09194 .
## campus.expOff-campus (other) 0.08164 0.57643 0.142 0.88737
## campus.expOff-campus (student) -0.02991 0.61935 -0.048 0.96148
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 517.11 on 531 degrees of freedom
## Residual deviance: 473.59 on 522 degrees of freedom
## (34 observations deleted due to missingness)
## AIC: 493.59
##
## Number of Fisher Scoring iterations: 4

```

### Below Basic Coefficients



There are more significant coefficients here than for the homelessness model. Master's students seem to be less financially precarious than PhD students, their negative coefficients indicate that these groups are less likely to be unable to meet basic needs than PhD students. Again, international students have the most significant coefficient. They are much less likely to be able to afford basic needs after housing than domestic students. The other factors, that of housing region and type, are not significant when the impact of program and citizenship are controlled.

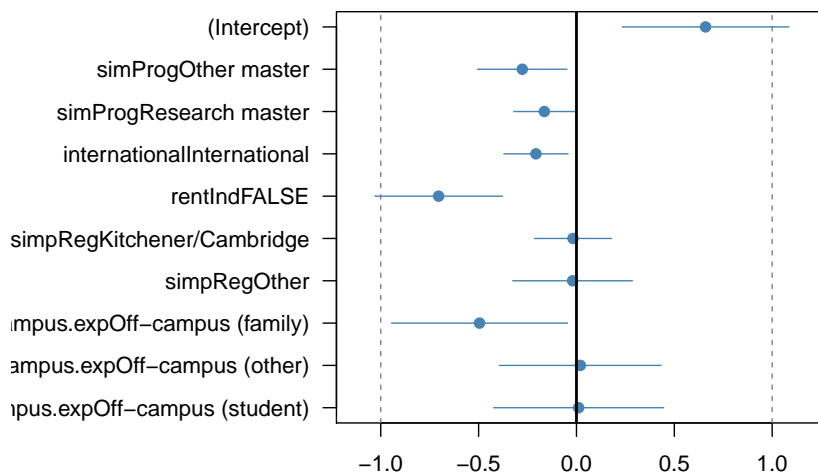
The final model is a poisson or log-linear regression of the count of quality issues. The reference level is the same as for the previous model: a domestic PhD student renting on-campus in Waterloo.

```

##
## Call:
## glm(formula = countQuality ~ simProg + international + rentInd +
##      simpReg + campus.exp, family = poisson, data = housing)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -1.9864  -1.3968  -0.5636   0.8639   4.6304
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)      0.65959   0.21727   3.036  0.0024 **
## simProgOther master -0.27685   0.11638  -2.379  0.0174 *
## simProgResearch master -0.16423   0.07965  -2.062  0.0392 *
## internationalInternational -0.20715   0.08383  -2.471  0.0135 *
## rentIndFALSE      -0.70432   0.16632  -4.235  2.29e-05 ***
## simpRegKitchener/Cambridge -0.01784   0.10009  -0.178  0.8585
## simpRegOther      -0.01970   0.15601  -0.126  0.8995
## campus.expOff-campus (family) -0.49520   0.22932  -2.159  0.0308 *
## campus.expOff-campus (other)  0.01995   0.21046   0.095  0.9245
## campus.expOff-campus (student)  0.01118   0.22166   0.050  0.9598
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for poisson family taken to be 1)
##
##      Null deviance: 1166.5  on 565  degrees of freedom
## Residual deviance: 1067.3  on 556  degrees of freedom
## AIC: 1932.8
##
## Number of Fisher Scoring iterations: 6

```

Quality Complaints Coefficients



The most salient feature of this model is the impact of renting. Note that the most significant coefficient is that for the rental indicator. Students that are renting report issues much more frequently than those that are not. Additionally, we can see that international students tend to report fewer issues than domestic

students, potentially because they are living in newer buildings which are less likely to have weathering (this can be seen in the exploratory plots).