Online schooling as a predictor of loneliness: a cross cultural perspective

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Abstract

Loneliness has been both theorised with regards to its onset and development and studied with respect to its prevalence among undergraduate students and its effects on cognition and physiology by social scientists both generally and specifically to young adults. Research has studied the prevalence of loneliness and multiple specific effects at an undergraduate level e.g. how loneliness effects each gender. However, the extensive body of literature involves undergraduate students who experience in-person classes. With the mass introduction of online teaching as a response to the covid-19 pandemic, this study aimed to fill the gap in the literature by providing a cross cultural perspective between two countries (Ireland and Canada) as to whether a relationship exists between loneliness and hours spent proportionately both in-person and online. Additionally, type of residence was factored in allowing for a greater and novel understanding as to how that predicts loneliness. Participants (N = 157) were recruited both through social media using voluntary response sampling and through recruitment websites using simple random sampling. Participants shared relevant demographic information and completed the UCLA Loneliness Scale. Results of a multiple linear regression found that in-person hours, online-hours, and the relationship between online hours and in-person was not a significant predictor of loneliness. This study indicates that other factors, such as age and country, are better predictors for loneliness occurring rather than the number of hours spent either with in-person or online schooling. The result of this study allows for a greater perspective into what the possible factors that predict loneliness.

Keywords: loneliness, undergraduate, online teaching, in-person teaching, Ireland, Canada.

Contents Page

Literature review

Theories of loneliness

Loneliness has been theorised and defined in many ways, both as a unidimensional and multidimensional phenomenon, and even defined positively such as people who purposely isolate themselves from other people to reflect and meditate (Hofstatter, 1957) (Margulis, Derlega, & Winstead, 1984.) (Gierveld, Developing and testing a model of loneliness., 1987) (Gierveld, Personal relationships, social support, and loneliness, 1989). This paper will not focus on the positive conception of loneliness, but rather what is most discussed by social scientists which is the negative aspects of without intention being excluded from relationships both in quality and quantity specifically for younger people (Mijuskovic, 1996) (McGraw, 1995) Although loneliness may affect everyone regardless of age in certain respects, different ages have different determining affects for what causes loneliness to manifest. For example, in older adults a predominant factor is the loss of a significant other but for the younger population such as those predominantly in undergraduate courses personality characteristics are (Perlman, 1988.) (Cutrona, 1982) (Schultz & Moore, 1986)First, we must understand how social scientists theorise about the origin and some factors that affect loneliness.

The three most extensively developed theories are the social needs perspective model, the cognitive discrepancy model, and the evolutionary theory of loneliness. (Heinrich & Gullone, 2006; Maragoni & Ickes, 1989). The social needs perspective model claims that how socially poor a person is objectively is associated with their own experience of loneliness. (Heinrich & Gullone, 2006; Maragoni & Ickes, 1989; Sullivan, 1953.). Loneliness occurs, if the relationship is not supported by the social needs (DiTommaso & Spinner, 1997.) The hypothesis is that social needs are not fixed therefore the degree of loneliness experienced will change across one's lifetime. Essentially, according to this theory a lack of social relationships has negative consequences to the individual (Sullivan, 1953.). This theory does not explicitly address if the quality of relationships is important, but it proposes that expressing oneself openly, for both genders, reduces loneliness which is supported by the literature.

The cognitive discrepancy model emphasis that how an individual perceives their relationship, for instance the quality of said relationship not the needs being fulfilled by the relationship is the key to determining whether someone will be lonely or not (Heinrich & Gullone, 2006; Russel, et al., 2012.). The assumption is as follows; people have an internal

standard, both conscious and subconscious, which is utilised to evaluate their relationships the quantity of their relationships and if the evaluation is insufficient loneliness occurs (Gierveld, et al., 2006; Russel, et al., 2012.)

For both these theories social environment is paramount as a factor to determine loneliness (Maragoni & Ickes, 1989). In contrast, the recently developed evolutionary theory does not put priority on social environment but rather combines it with genetics to explain the occurrence of loneliness. (Spithoven, et al., 2019.) This theory also does not exclusively focus on the negative sides of loneliness but the positive ones too (Spithoven, et al., 2019.) The argument is we have evolved to feel loneliness as a protective measure. We avoid feeling lonely which means we maintain relationships (Cacioppo, et al., 2014; Cacioppo, 2008.). The design of this evolutionary trait is so as not to lose important relationships (Cacioppo,et al., 2015)

Elaboration of these theories is not to draw a conclusion as to which one holds true more so than others but rather to highlight that the concept of loneliness is not a simple or universally defined one nor is the causes that spark its onset and development. Of these predominant theories there is no academic consensus as to which is most applicable to explain how loneliness manifests, yet it is agreed that loneliness is not simply a lack of relationships (Wenger, et al., 1996). Some individuals live a life of solitude and do not report a high level of loneliness. Despite the lack of a causal relationship between loneliness and isolation there is a statistically significant correlation (Wenger, et al., 1996). A notable lack of evaluation for each theory is apparent by social scientists but justified as to conclusively determine what causes loneliness, it would be impossible as there are far too many inter-relationships between psychological, demographic and physiological factors to name a few (Cacioppo, 2008.). However, for younger people some of the main factors which affect loneliness occurring or not is the quality of the relationships, the number of relationships, and a sense of belonging to a community (Cacioppo, et al.., 2008.). Understanding of the complicated nature of the phenomenon of loneliness is vital but to justify why loneliness should be studied specifically with undergraduate students the effect of loneliness on an individual particularly with regards to their cognition, physiology but also for this specific study academic performance both short and long term should be investigated.

Cognitive, Physiological, and Academic Consequences of Loneliness.

University students, specifically those completing an undergraduate degree, experienced loneliness commonly pre the covid-19 pandemic when class was delivered traditionally (Arslan, 2021). This has been documented in multiple countries in the western world including Canada

(Arslan, 2021; Killeen, 1998.). To the best of the authors knowledge Ireland has not published a study regarding the prevalence of loneliness of third-level students therefore this generalisation is, thus far, not inclusive of the Irish undergraduate student population. An extensive body of literature has found people who are lonely are at a high risk of developing depressive symptoms and anxiety regardless of gender or age (Kim & Cho, 2017; Richardson, Elliot, & Roberts, 2017). Moreover, undergraduate students with loneliness have a positive association with addictive behaviours (Habibi, Hosseini, & Darharaj, 2018.), aggressive behaviours (Yavuzer & Kilicarslan, 2019.) and poor psychological wellbeing (Doman & Roux, 2012.).

Furthermore, researchers who investigated the effects of loneliness on university students found poor social skills and competence (DiTommaso, et al., 2003.), statistically high levels of social anxiety (Moore & Schultz, 1983.), low self-esteem (McWhirter, 1997), and withdrawal from social interaction (Ozdemir & Tuncay, 2008.).

Decreased executive functioning (Cacioppo, et al., 2000.), an acute sensitivity to social stimuli and registering said stimuli as threats (Cacioppo, et al., 2009) and increased depressive symptomatology (VanderWeele, et al., 2011.) have been documented regardless of age with respective to those who experience loneliness. When controlling for age, education, IQ, social class Gow (2007) found a statistically significant decline in IQ claiming that loneliness is not a consequence of this cognitive decline but rather a predictor.

With an understanding of some cognitive and physiological consequences with respect to in-person lectures how does loneliness affect people who are attending classes online. Vakoufari et al. (Vakoufari, Christina, & Mavroidis, 2014.) investigated the effect of *distance learning*, that is learning through video or on telephone with a tutor, compared to traditional learning on students and found that students who can communicate efficiently with other students and tutors experience less intense loneliness. Previous research, as noted previously, has highlighted that people who experience loneliness may suffer to communicate fluently in social settings however this study highlights that if the opportunity to talk to fellow students and teachers presents itself combined with a sense of belonging to a community it can not only work as a preventive of loneliness developing for some individuals but also work as intervention alleviating, to varying degrees, the negative consequences of those who are lonely such as perceiving social interactions as a threat (DiTommaso, et al., 2003; Vakoufari, et al., 2014.). Furthermore, this study found that academic performance, resigning from the course before completion and general course satisfaction is negatively affected by those experiencing high levels of loneliness. Although this study did not find online schooling alone was a predictor of loneliness. Notably, this study involved people aged 31-35 that is significantly older than the mean age of the undergraduate

population combined with a small population (88 participants) and whilst strong internal reliability was achieved the generalisability cross-culturally is challenged. Despite this, it provides a valuable and exclusive insight into how e-learning may affect the degree of loneliness experienced by people in an academic setting.

Although these cognitive and physiological consequences of loneliness are documented extensively researchers continue to debate the extent to which each gender is affected by loneliness generally and specifically to undergraduate students (Panayiotou, et al., 2016.). If one gender is affected it by it more or less so than the other it would be important to document how with respect to cognition, physiology and academic performance. Male students in their first year of an undergraduate degree have been found to experience a more severe degree of loneliness than their female counterparts (Deniz, Hamarta, & Ari, 2005). Yet conflicting research has found that females undergo loneliness more consistently throughout their undergraduate years (Goosby, Bellatorre, & Walsemann, 2013). Research has attributed the conflicting results of these studies to the different instruments used to assess the level of individual loneliness and cultural expectations i.e., men in some cultures commonly in the west are less inclined to speak about negative emotions (Cramer & Neyedly, 1998). Additionally, it seems that for women inadequate social skills and low self-esteem is a predictor of loneliness whilst for men the predictor of loneliness is how sensitive they are to feeling anxious (Deniz, Hamarta, & Ari, 2005). Nevertheless, despite the debate what is inarguable is that both men and women who suffer from loneliness experience negative affects both to their cognition and physiology that affects their individual lives. The changes to each genders physiology and cognition is a possible area for future research. An appropriate question from these findings is are there any long-term consequences to loneliness that develop from this early stage or any long-term consequences that threaten to damage an individual's cognition or physiology.

Manifestation of Long-Term Complications on physiology and cognition.

With the understanding of the immediate consequences of loneliness that affects each gender of young adults, the mean demographic attending undergraduate courses, long term complications from loneliness that begin developing at the young adult stage and/or ones that may develop in middle to late adulthood if interventions are not implemented also exist. Meta-analysis reported that individuals who suffer from loneliness consistently throughout their lifetime have a 1.45 mortality rate which is quadruple the likelihood of increased mortality from exposure to air pollution and double that of those who suffer from obesity (Holt-Lunstad, Smith, & Layton). Men are affected by this increase in mortality rate more (Holt-Lunstad, Smith, & Layton). Subsequently a longitudinal study replicated these findings of an increase in mortality of

those who suffer loneliness although the quality of social relationships is quoted as insufficient to explain the reason for this increased mortality (Lou, Hawkley, Waite, & Cacioppo, 2012). Additional longitudinal studies attempted to explain the reported increase in mortality and discovered health behaviours i.e., physical exercise did not explain the increase although physical activity was reduced for every age group, including young adults (Hawkley, Loneliness predicts reduced physical activity: Cross-sectional and longitudinal analyses, 2009).

A longitudinal study, replicated several times, has determined the association between loneliness and mortality begins when one starts to experience loneliness initially whether that be in childhood, adolescence and early adulthood as loneliness is seen to increase blood pressure and produce negative effects on cardiovascular health (Caspi, et al., 2006.). This is independent of gender, age, health conditions, social support, cardiovascular risk factors, and medications (Hawkley & Cacioppo, , 2013.). Although debate continues as to what physiological mechanisms are responsible for this as with age differing mechanisms exert more influence it is indisputable that although an increase in mortality may not affect the undergraduate student population suddenly the negative effects of loneliness are already developing in a way that will have negative long-term effect on one's health.

The extensive empirical evidence has documented a negative effect to mortality due to loneliness. Larger studies, such as that by Wilson (Wilson & Krueger, 2007.) which included 823 older adults, those who suffered high levels of loneliness had a decrease in, for example, the functioning of forming memories, understanding their environment spatially but not working memory and episodic performance. Of the 828 adults, 76 developed dementia in the 5-and-a-half-year period of the study. Loneliness did not cause dementia to manifest in those with higher loneliness, as many factors would result in that disease occurring, but it was reported to be a factor which increased the likelihood of dementia developing (Wilson & Krueger, 2007.). Multiple studies have replicated studies of this nature consistently finding a correlation between the development of dementia and increased mortality among those who report a high level of loneliness (Heinrich & Gullone, 2006; Gierveld, 1987).

The long-term complications albeit not immediately affecting undergraduate students are important to highlight. Not exclusively to understand the severity of the affect on cognition and physiology long-term that begins in young age but as outlined loneliness can manifest behaviours, like seeing social stimuli as threats. This may cause the individual experiencing that to be further isolated from their peers. If behaviours such as these becomes a habit for undergraduate students experiencing loneliness, they may find themselves lacking both relationships in quality and quantity throughout their lifetime increasing the likelihood of

developing long term complications from loneliness. An extensive body of literature has outlined the negative affects of loneliness on cognition, physiology and academic performance both short and long term therefore despite the lack of consensus about the factors that cause loneliness to manifest it is well documented how it can affect the individual thus the question arises is loneliness prevalent for those who are completing their degree fully/partially online.

Present study

While many theories speculate as to the causes of loneliness and some of the factors that affect it, what is inarguable is the affect loneliness has for those who suffer with it is acute both immediately, and the long term consequences that begin manifesting themselves as early as at the undergraduate level with respect to mortality, cognitive decline both possible with respect to IQ for all ages, and dementia that while it may not affect undergraduate students directly, if the behaviour consequences of loneliness such as heightened social vigilance remains they may suffer loneliness long term. Additionally, studies explored the affects and prevalence of loneliness on undergraduate students attending different courses in different cultures across different ages, races, and genders to name a few. No study to the researcher's knowledge, has investigated online hours as a factor predicting loneliness at an undergraduate level or in an Irish undergraduate context nor how the type of residence one resides in predicts loneliness. While many studies have focused and established the negative affects of loneliness on people generally and specifically to young adults with respect to their physiology, cognition, and academic performance to highlight the severity of loneliness research has not yet examined the relationship between loneliness and online hours and the relationship between loneliness and in-person hours among undergraduate students completing their degree either fully online or mixed with in person and online.

To fill this gap in the research, this study will provide a novel cross-cultural investigation into if a correlation exists between loneliness and online hours, loneliness and in-person hours, and the interaction between the two. Loneliness and age, loneliness and gender will also be examined for a correlation. This study will also, for the first time in the academic literature, assess the relationship between the type of residence one resides in and loneliness. The rationale for assessing residence type being it may allow for a perspective to some theories with respect to whether social isolation or the quality of relationships impact loneliness experienced.

Research hypothesis from these aims:

(1) Online hours, in-person hours, and the interaction between the two are predictors of loneliness.

(2) A statistically significant difference exists between the level of loneliness reported in Irish students and Canadian students.

(3) A statistically significant difference exists between loneliness and gender.

(4) A statistically significant difference exists between loneliness and residence type.

(5) A statistically significant difference exists between loneliness and age.

METHODS

Participants

Participants were recruited using simple random sampling and voluntary response sampling. The study was briefly described and linked into a social media group where people volunteered to answer, also with consent of a lecturer at the National College of Ireland. The study was described to a group of students who also volunteered to answer the link provided, lastly participants were recruited and paid a monetary incentive (minimum 30 cent maximum 50 cent) on the recruitment platform prolific. A simple linear regression was utilised in this study.

The sample size amounted to 157 people from several colleges and universities offering undergraduate programs across Ireland and Canada. All participants were over the age of 18, attending a full-time undergraduate programme with 95 of them being female (61%) and 62 male (39%). The mean age of the participants is 21.9 (SD = 4.3) ranging from 18-49. With respect to each country there is 123 Canadian participants (78%) and 34 Irish participants (22%) whilst with regards to the residence type 66 of people lived with family (42%) 33 in dorms (21%) 35 alone in a private residence (22%) and lastly 23 in other (15%).

Measures

The University of California, Los Angeles (UCLA) Loneliness Scale is a 20-item unidimensional self-report instrument. It is used to assess the degree of loneliness and social isolation that one feels. Although there is no threshold where one is deemed to be lonely and/or socially isolated higher results increase the likelihood of an individual being lonely and/or socially isolated. Participants were asked to read 20 statements on a 4-point frequency scale from Never to Often. For example, one item is "No one really knows me". The scoring was continuous. No items were reverse scored. The UCLA Loneliness Scale has demonstrated strong internal consistency (coefficient ranging from .89-.94) across multiple cultures which has resulted in it becoming the most widely implemented instrument to assess loneliness for young adults and adolescents. The Cronbach alpha coefficient for this instrument in this study is .95 which is considered excellent internal reliability.

Design

The current study utilised a quantitative approach with a cross-cultural, cross-sectional and observational design. For all research questions a between-participants design was used. The

criterion variables were loneliness while the predicter variables were in-person hours, online hours, gender, age, type of residence, and country.

Procedure

Data was gathered by a Google Forms survey and transferred to the program Spyder which uses python to compute relevant statistical procedures. A brief description of the nature of the study was uploaded to a social media group with a link to the survey. This brief description included the length it would take to complete the questionnaire (5 minutes), what was required of them, and who could partake. This information was also provided to a class during a lecture at the National College of Ireland, with the consent of the lecturer and the link provided. Moreover, those who wished to participate on the recruitment website was presented with this same information. Those who clicked the link were firstly presented with a Participant Information Sheet (see Appendix A) which elaborated further on the nature of the study, what the study entailed, requirements for participation who was conducting the research and why and contact information to the student researcher if any questions needed to be addressed. Participants were informed that the data was anonymous therefore they may exit from the questionnaire at any time but once submitted it would be impossible to withdraw their data.

The consent form followed from the information sheet. Many points in the information sheet were re-iterated here (see Appendix B). If they consented to partaking in the study, they had to confirm that they were 18+ and undertaking a full-time undergraduate degree. Subsequently, they were asked relevant demographic information that being age, gender, general residence, and the college/university one was enrolled at (see Appendix C). After this information was provided the UCLA Loneliness Scale (see Appendix D) was presented. Upon completion all participants were provided with a De-Briefing form (see Appendix E) which thanked participants for participating and re-stated the aims of the study. Additionally, several helplines were highlighted for both people in Canada or Ireland.

This study was approved by the Ethics Committee at the National College of Ireland (NCI) and aligned with the NCI Ethical Guidelines and Procedures for Research involving Human Participants and the Psychological Society of Ireland Code of Professional Ethics. Whatever changes to the original ethics proposal form that can be found here have been approved in writing by lecturers overseeing this study. In the unexpected instance that participants became distressed by the study the debriefing form included relevant helplines both in Ireland and Canada.

Results

Descriptive Stats

Demographic variables are presented in Table 1 78% of participants attended Canadian universities (N = 123) with 22% attending Irish universities (N = 34). With respect to gender 61% are female (N = 95) and 39% male (N = 62). 42% of participants live with family (N = 66), 21% in dorms/student accommodation (N = 33), 14% alone in a private residence (N = 22), 15% in other (N = 23). Mean age of participants is 21.9 (SD = 4.3) ranging from 18-49.

Table 1

Demographic table

Variable		N	Valid Percentage
Country	Ireland	34	22%
	Canada	123	78%
Gender	Male	62	39%
	Female		
Residence			
	Family	66	42%
	Dorms	33	21%
	Alone	22	14%
	Other	23	15%

Correlations between predictor variables and loneliness is shown below (see Table 2).

Table 2

Spearman's correlations.

	Loneliness	Inperson	Online	Proponline	Residence	Age	Gender
Loneliness	1.0	-0.79	0.05	0.046	0.93	-0.06	-0.12
Inperson	-0.08	1.0	-0.61	-0.96	0.01	-0.08	0.02
Online	0.06	-0.61	1.0	0.76	-0.14	0.03	0.03
Proponline	0.05	-0.96	0.76	1.0	-0.11	0.09	0.03
Residence	0.03	0.1	-0.14	-0.11	1	0.10	-0.16
Age	-0.06	-0.08	0.03	0.09	0.10	1.0	0.18
Gender	-0.12	0.022	0.15	0.02	-0.16	0.18	1,0

Research Question 1

Figures 1-3 show total online hours, total in-person hours, and the proportion of online hours vs loneliness. It doesn't look like there is a link with loneliness.

Figure 1

Scatterplot of total online hours vs loneliness

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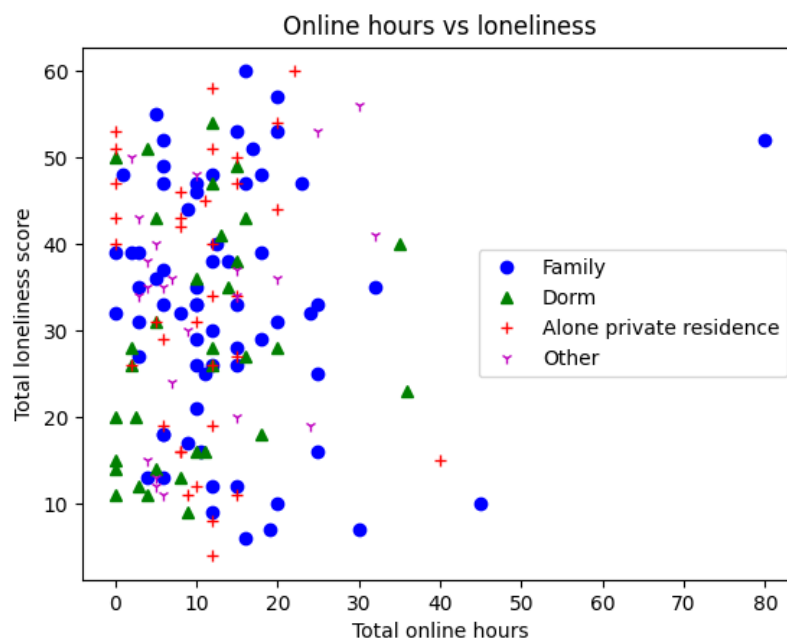
Figure 2

Scatterplot of total in-person hours vs loneliness
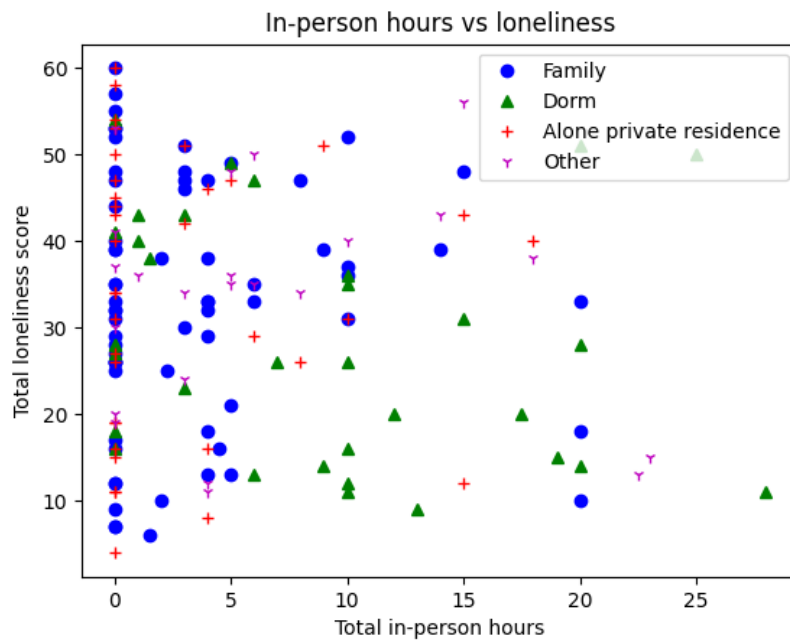
Figure 3

Scatterplot of proportion of online hours vs loneliness
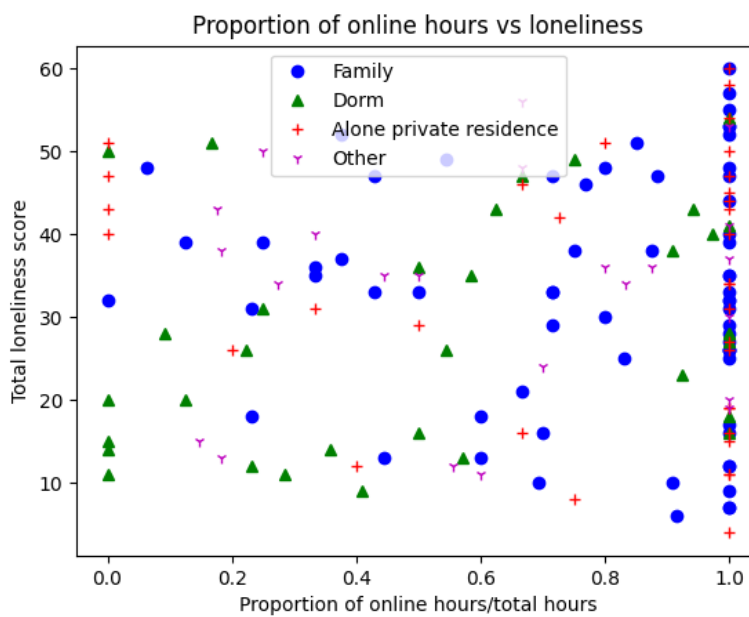
To assess total online hours, total in-person hours, and the interaction between in-person and online hours as predictor variables for loneliness a multiple linear regression was used. To ensure no violations of assumptions the Q-Q plot was assessed for normality and although some snaking was evident it was not catastrophic (see figure 1 in Appendix F). For equality of variance the residuals vs fitted values plot was assessed (see figure 2 in Appendix F) and lastly Cook's distance plot for influential points to ensure that no point was very influential. One very influential point was found (greater than 1), so if the result of this regression is significant, I will repeat the regression without that point to make sure the result wasn't only from this point.

The results (table 3) found online hours does not predict loneliness (F=0.65, p=0.4) in person hours does not predict loneliness (F = 1.60, p = 0.21) and the interaction between in-person and online (F = 0.5, p = 0.48) was found to not be a predictor of loneliness. R-squared = 0.018.
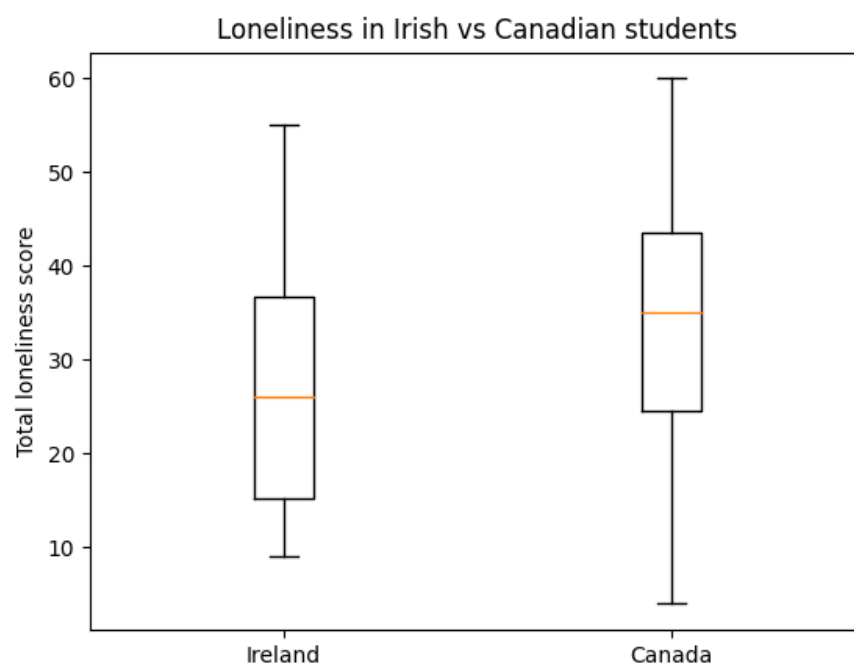
Table 3

Regression results

	Df	sum_sq	mean_sq	F	p
Online	1.0	134.14	134.14	0.65	0.42
Inperson	1.0	330.68	330.68	1.60	0.21
online:inperson	1.0	103.83	103.83	0.50	0.48
Residual	153.0	31654.17	206.89	-	-

Research Question 2

A Mann Whitney U-Test was used to determine if a significant difference in loneliness exists between Irish and Canadian students. Figure 4 shows loneliness for Irish and Canadian students. The QQ plots for normality showed quite a lot of snaking and although technically meeting the requirement of the central limit theory the limited data points in the Irish sample made me less confident about the QQ plot so a non-parametric test was used (see figures 1 and 2 in Appendix G). The results found a significant difference between the two nationalities (U = 169.0, p = 0.022).

Figure 4

Loneliness in Irish vs Canadian students

Further analysis with multiple linear regressions for the countries separately found both countries did not report a significant relationship between hours spent online and loneliness

(Ireland: F = 0.91 p = 0.35, Canada: F = 0.004, p = 0.95, tables 4 and 5) or in-person hours and

loneliness (Ireland: F = 0.25 p = 0.62, Canada: F = 0.61, p = 0.43, tables 6 and 7).

Table 4

Regression results for Ireland; online hours vs loneliness

Ireland	Df	sum_sq	mean_sq	F	p
Online	1.0	192.77	192.77	0.91	0.35
Residual	32.0	6800.99	212.53	-	-

Table 5

Regression results for Canada, online hours vs loneliness

Canada	df	sum_sq	mean_sq	F	p
Online	1.0	0.72	0.72	0.004	0.95
Residual	121.0	24393.97	201.60	-	-

Table 6

Regression results for Ireland, in-person hours vs loneliness

Ireland	df	sum_sq	mean_sq	F	p
Inperson	1.0	54.10	54.10	0.25	0.62
Residual	32.0	6939.67	216.86	-	-

Table 7

R*egression results for Canada, in person hours versus loneliness*

Canada	df	sum_sq	mean_sq	F	p
Inperson	1.0	123.06	123.06	0.61	0.43
Residual	121.0	24271.63	200.59	-	-

Research Question 3

To determine if there is a difference in loneliness between male and female students a Mann-Whitney U-Test was used. Figure 5 shows loneliness for male and female students. Like country, the QQ plots for normality showed a lot of snaking so I used a non-parametric test even though there were more than 30 participants (see figures 1 and 2 in Appendix H). No significant difference was reported between male and female students (U = 2528.0, p = 0.07).

Figure 5

Loneliness in male vs female students

Loneliness in male vs female students
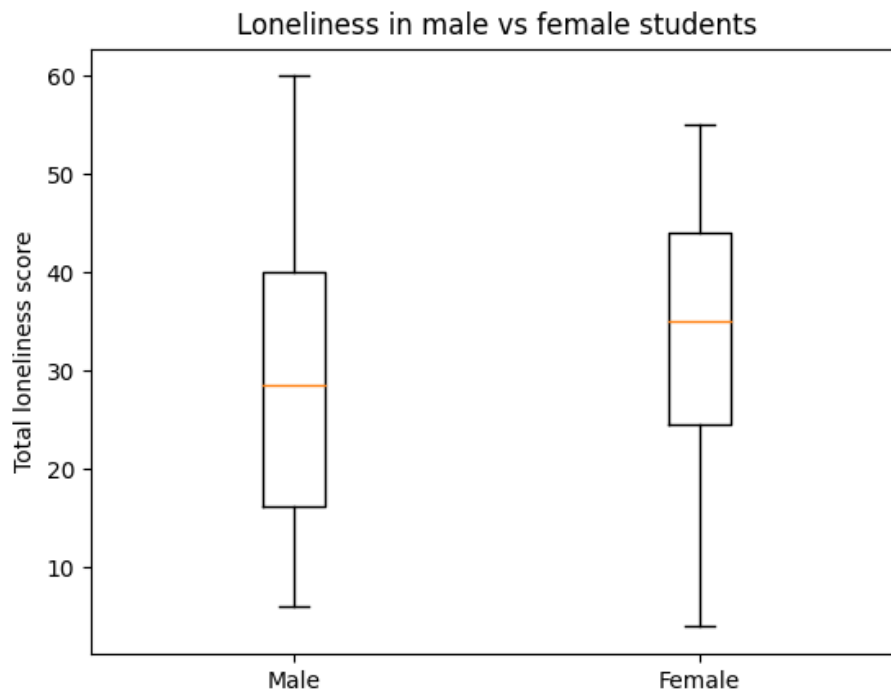
Research Question 4

A Kruskal Wallis H test was used to determine if there is a difference in loneliness between different residence types. Figure 6 shows loneliness for students living in different residence types. Similar to country and gender, the QQ plots for normality showed a lot of snaking (see figures 1-4 in Appendix I). A non-parametric test was used because of this and because within residence, four sub-groups exist, and some did not reach the threshold of 30 despite the overall being greater than 30. There was no significant difference in loneliness between the four types of residence (chi-squared = 2.96, p = 0.40).

Figure 6

Loneliness vs the different residence types
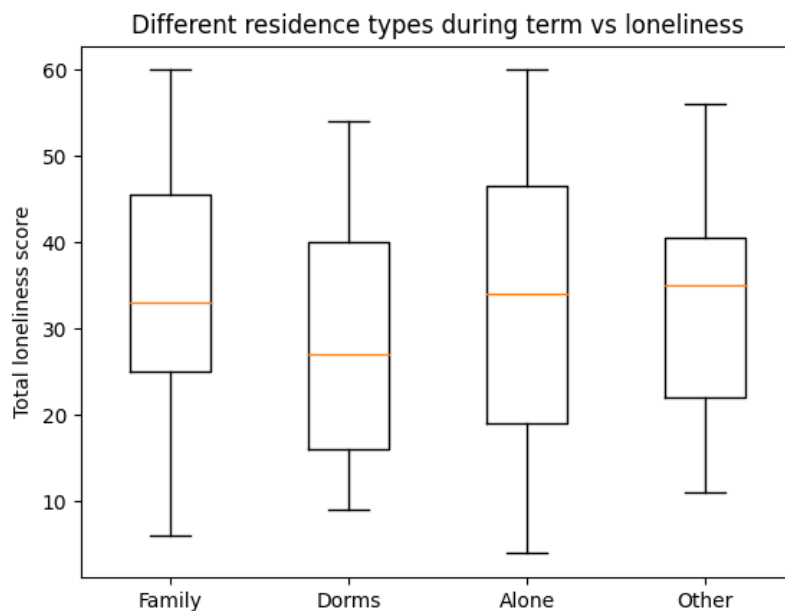
Research Hypothesis 5

To assess age as a predictor variable for loneliness a simple linear regression was used. Figure 7 shows age vs loneliness. To ensure no violations of assumptions the Q-Q plot was assessed for normality and although some snaking was evident it was not catastrophic (see figure 1 in Appendix J), with equality of variance residuals vs fitted values were assessed (see figure 2 in Appendix J). The spread of data points across the width of the residuals versus fitted plot was not the same, it was significantly smaller on left than right therefore I will treat any results with caution. Lastly Cook's distance plot for influential points not to test for an assumption only to ensure that no point was very influential which none were (see figure 3 in Appendix J).

Figure 7

Scatterplot of age vs loneliness
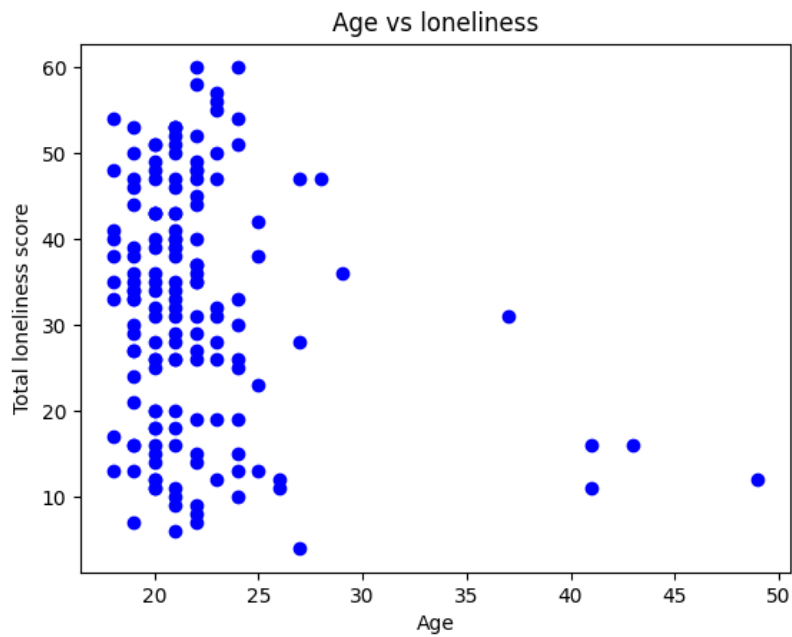
Age did report a statistically significant difference ($F = 5.43$, $p = 0.021$; see table 8). R-squared = 0.034. The result is significant (0.021) but would take the results with caution because the assumptions were not met adequately.

Table 8

Regression results for age vs loneliness

	df	sum_sq	mean_sq	F	p
Age	1.0	1091.38	1091.38	5.43	0.021
Residual	155.0	31131.47	200.85	-	-

Discussion

The literature has both theorised and supported the correlation between loneliness and both the quality of relationships and the number of social relationships one has. This study provided a lack

The first research hypothesis investigated whether total online hours, total in person hours predicted loneliness and whether the relationship between online hours and in-person hours reported a significant relationship with loneliness. This hypothesis was not supported by the data. Notably, there was a limited spread of data for the in-person hours which may have affected these results.

The second research hypothesis investigated if there was a statistically significant difference between the results of both countries. This was supported by the data therefore there is a statistically significant difference between the two countries. However, further investigation found that neither country independently was a predictor for loneliness. If each country had an equal number of participant's this may affect these results.

The third research hypothesis investigated if a statistically significant relationship existed between gender and loneliness. This was not supported by the data. However, if each gender had an equal number of participants this may affect the results.

The fourth research hypothesis investigated if a statistically significant relationship existed between type residence type and loneliness. The data did not support the hypothesis. If each sub-group within residence type had an equal number of participants it may affect results.

The fifth research hypothesis investigated if a statistically significant relationship between age and loneliness existed. This was supported by the data. However, the result should be treated with caution as assumptions were not adequately met.

Social scientists have theorised that with young people a predominant factor predicting loneliness is isolation and the quality/lack of quality of social relationships. Results are consistent with literature that while in-person hours are not a predictor of loneliness, and now we understand online-schooling to not be a predictor, this does not mean that loneliness is not prevalent among the undergraduate population. While this study has not concluded what factors are causing/predicting loneliness to be prevalent among undergraduate students, it has demonstrated what factors may not be.

Practical Implications

This study has produced findings that are important both for practical implications and theory. Most people lived with family providing a perspective for the idea that quality of relationships is of paramount importance when preventing loneliness occurring to a high and consistent degree. Future research could divide these residence sub-groups with an equal number of participants to determine if the findings of this study are replicated.

Whilst a correlation was not found to exist between online hours and loneliness or in person hours and loneliness the prevalence of loneliness was not able to be assessed due to the nature of the questionnaire. This would be an area for future research to determine. Nevertheless, loneliness was still present even for some individuals in this study to a high level. Although other factors, such as age, are stronger predictors of loneliness more so than in-person hours or online hours or the relationship between the two it is important to acknowledge that the severity of the effects of loneliness on cognition, physiology and academic performance. Therefore, universities and colleges should ensure relevant support services are available for people attending, not just an undergraduate program but all programmes, and opportunities for students to meet with peers of all age-groups so the opportunity to develop good quality relationships exists.

Strengths and weaknesses

This study is the first to investigate the relationship between loneliness and hours in-person versus online and independently at an undergraduate level. Whilst some undergraduate programmes remain online and the possibility of a mass re-introduction of online classes under a special circumstance in the future it is an area requiring continued research. Additionally, this study has introduced investigating residence type as a factor to consider when investigating predictors of loneliness. Loneliness is often investigated with one group of participants in a particular culture. While this has allowed for greater understanding to various aspects of loneliness it is limited by its generalisability. This cross-cultural study has, with its strong internal reliability, allowed for greater generalisability.

The numbers within each sub-group for each variable may have impacted the results as some were limited. Further research could incorporate a larger sample size for each sub-set. Additionally, although no difference was found between the two genders it is important to note that it was disproportionately female. Although the literature is divided on which gender experiences loneliness more severely, an area for future research could be which gender experiences loneliness to a higher degree, if any, with the premise of this study. Moreover, it is unclear how accurate participants were with respect to whether they took the task seriously or not

as the questionnaire was taken anonymously online whilst assuming the questionnaire was taken seriously it is an area for future research.

Conclusion

This study found no significant relationship between online hours, in-person hours nor the relationship between the two on loneliness. Additionally, research found no significant difference between the type of residence with regard to loneliness. Research has highlighted that loneliness is prevalent among university students across multiple cultures however results indicate that neither in-person hours, online hours or residence type are significant factors influencing loneliness. This study attempted to fill the gap in the current research by determining how, cross-culturally, novel factors predict loneliness. Future studies may investigate how prevalent loneliness is among undergraduate students who are primarily online comparative to those primarily in-person.

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Appendices

Appendix A

Participant Information Sheet

Thank you for your interest in partaking in this study.

Please take the time to read this document as it will help you make an informed decision as to whether you wish to participate in this study or not.

This document explains why the research is being conducted and what it would involve for you. If you have any questions about the information provided, please do not hesitate to contact the student researcher using the email at the end of this sheet.

What is this study about and who can participate? The student researcher is a final year student at the National College of Ireland completing a BA in Psychology. As part of the degree, it is required to complete an independent research project. For this project, the aim is to investigate whether full-time undergraduate third-level/college/university students experience loneliness to different degrees depending on the hours they attend in-person and onlime lectures and compare the results between two countries (Ireland and Canada). You may participate only if you are over the age of 18 and you are attending a full-time undergraduate program in Ireland or Canada and you must be fluent in English.

What will be required of you? If you decide to continue you will be presented with a **consent form** where you must agree to participate. If you consent you will be presented with a few questions regarding **background information** relevant to the study. This will require you to select your gender, select whether you live at home, in student accommodation, alone in a private residence or other, your age, how many hours per week you have in person and online lectures during term, and which third-level institution you attend. Subsequently you will be presented with a **questionnaire** that is designed to assess your level of loneliness. You will be shown several statements and you will be required to answer between often and never. For example, "I am unhappy doing many things alone". Upon completion, you will be presented with a de-briefing sheet outlining how you can contact the student researcher, and relevant support services.

Answering the questionnaire will take approximately 5 minutes. If you feel answering questions of this nature may cause distress you do not have to participate. You can exit out of the questionnaire at any time without penalty and support services will be provided in the debriefing sheet. However, once you submit the questionnaire it will be impossible to withdraw your data as it cannot be identified back to you due to no personal identifiers being collected from you e.g., your name or address.

Benefits to partaking in the study: Partaking in this study is completely voluntary. You will not be paid unless you are coming from a recruitment website. However, participation will mean the results can be published which will add to the understanding of how prevalent loneliness is for third-level students in Ireland and Canada and how online schooling affects it.

If you wish to participate please continue onto the next page.

Signed,

Robert Jones (x18426602@student.ncirl.ie)

Appendix B

<div align="center">

Consent Form

</div>

In agreeing to participate in this research I understand the following:

- This research is being conducted by Robert Jones an undergraduate student of Psychology at the School of Business, National College of Ireland.

- The method proposed for this research project has been approved in principle by the Departmental Ethics Committee, which means that the Committee does not have concerns about the procedure itself as detailed by the student. It is, however, the above-named student's responsibility to adhere to ethical guidelines in their dealings with participants and the collection and handling of data.

- I will not complete the questionnaire if I am under the age of 18.

- I will be asked to provide information regarding if I attend a full-time third level degree, my gender, my age, how many hours I spend attending lectures on campus and online, what accommodation I reside in and which third level institution I attend.

- If I have any concerns about participation, I understand that I may refuse to participate or exit out of the questionnaire.

- I have been informed as to the general nature of the study and agree voluntarily to participate.

- I am aware all data from the study will be anonymous.

- The data from all participants will be compiled, analysed, and submitted in a report to the Psychology Department in the School of Business.

- At the conclusion of my participation, any questions or concerns I have will be fully addressed or if not the researcher will be contactable to answer directly.

- I may exit from the questionnaire at any time, however once my results are submitted it will be impossible to withdraw the data as there will be no way to identify it back to me.

Appendix C

What is your age?

_____

Which third level or post secondary institution/college/university do you attend?

_____-

What is your gender?

Male

Female

How many hours of in-person teaching do you have on average per-week during term/semester?

_____

How many hours of online teaching do you have on average per-week during term/semester?

_____

In which type of residence do you live in during term?

Student accommodation/dorms

With Family

Alone in a Private Residence

Other

Appendix D

INSTRUCTIONS: Indicate how often each of the statements below is descriptive of you. C indicates "I often feel this way" S indicates "I sometimes feel this way" R indicates "I rarely feel this way" N indicates "I never feel this way"

1. I am unhappy doing so many things alone O S R N

2. I have nobody to talk to O S R N

3. I cannot tolerate being so alone O S R N

4. I lack companionship O S R N

5. I feel as if nobody really understands me O S R N

6. I find myself waiting for people to call or write O S R N

7. There is no one I can turn to O S R N

8. I am no longer close to anyone O S R N

9. My interests and ideas are not shared by those around me O S R N

10. I feel left out O S R N

11. I feel completely alone O S R N

12. I am unable to reach out and communicate with those around me O S R N

13. My social relationships are superficial O S R N

14. I feel starved for company O S R N

15. No one really knows me well O S R N

16. I feel isolated from others O S R N

17. I am unhappy being so withdrawn O S R N

18. It is difficult for me to make friends O S R N

19. I feel shut out and excluded by others O S R N

20. People are around me but not with me O S R N

Appendix E

De-Briefing Sheet

Thank you for completing the questionnaire. Your contribution means the question hoped to be answered will be answered. **Please submit the form below**.

If you have any questions or concerns regarding the study, please do not hesitate to contact me at x18426602@student.ncirl.ie.

If you have experienced any distress by the questions asked you can also contact me or the support services provided below.

It is impossible that the answers you gave can be used to identify you. It is completely anonymous and therefore cannot be withdrawn.

The data will be gathered by myself, and it will be stored for 5 years as is required by the ethics committee of the National College of Ireland. It will be stored professionally in a password locked hard-drive and after 5 years will be wiped.

The research paper will be completed and ready to view on the 14th of March 2022, please contact me if you wish to view it and I will send you the full paper upon completion. Your time and contribution has been greatly appreciated.

Signed,

Robert Jones.

Support services Ireland:

1. Jigsaw (helpline for adults with anxiety aged 12-25) : (01) 472 7010

2. Crisis Text Line (for emergency support as a result of anxiety) : 741741

3. Samaritans (support for any mental distress) : 116123

Support services Canada:

1. Crisis Text Line (for adults suffering anxiety): (686868)

2. Canada Suicide Prevention Service (for adults in need of urgent help due to mental health): (1-833-456-4566)

Please submit your form after reading.

Appendix F

Assumptions plots for the multiple linear regression with total online hours and total in-person hours as predictor variables

Figure 1

Q-Q plot for normality
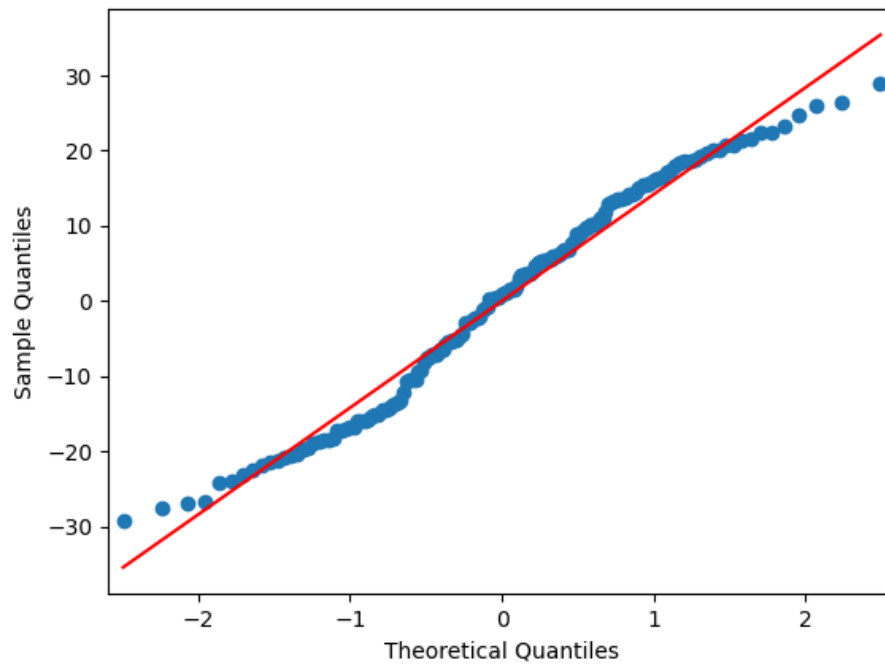
Figure 2

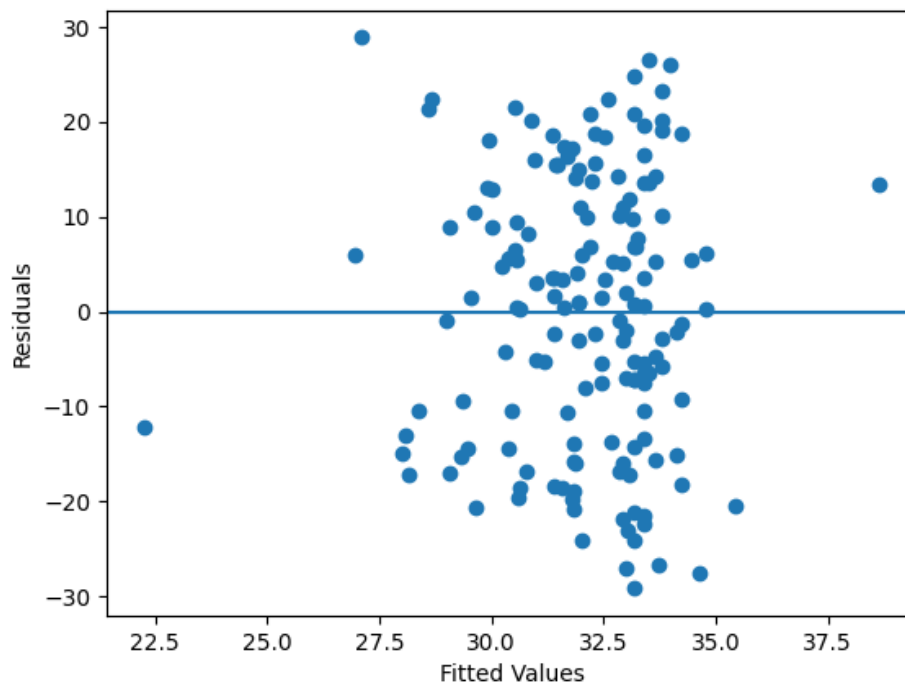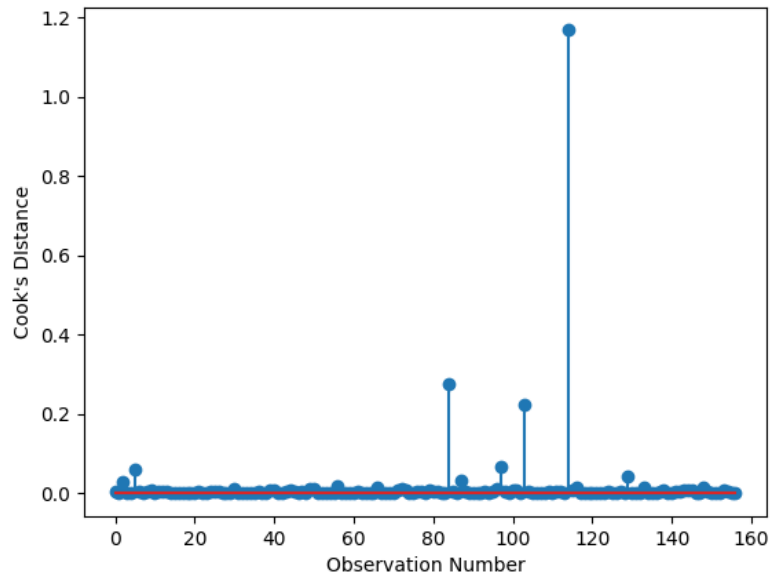*Residuals vs fitted values plot for equality of variance*

Figure 3

Cook's distance plot for influential points

Appendix G

Figure 1

QQ plot for normality for the data from Ireland
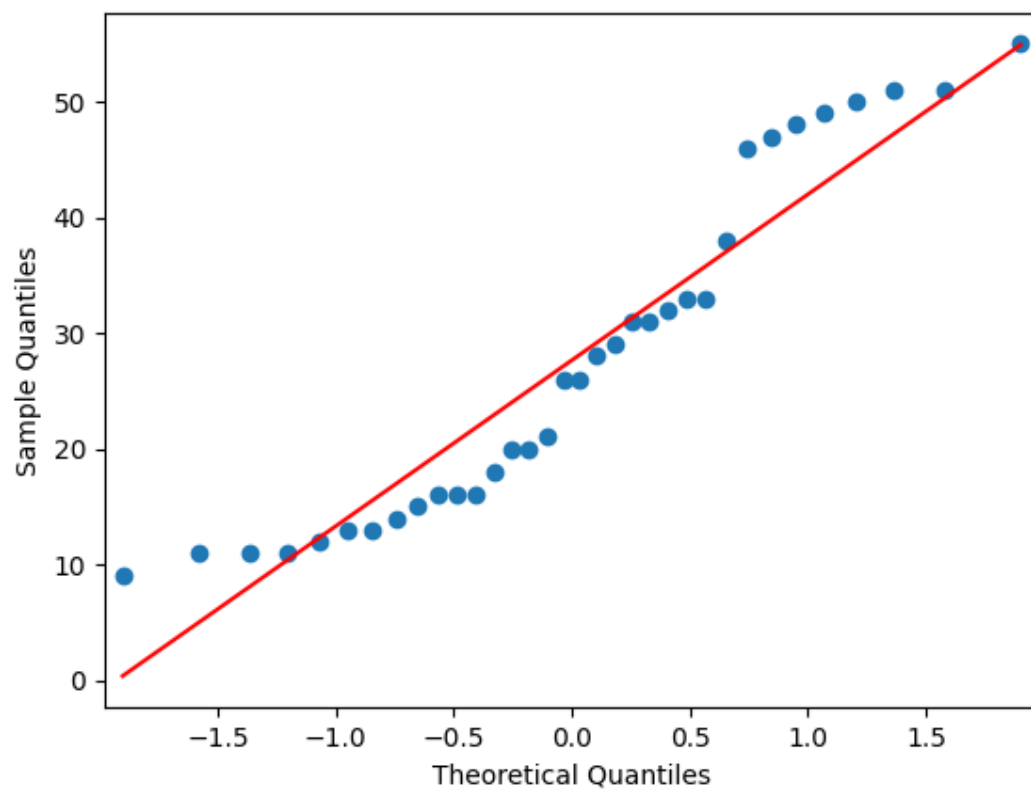
Figure 2

QQ plot for normality for the data from Canada
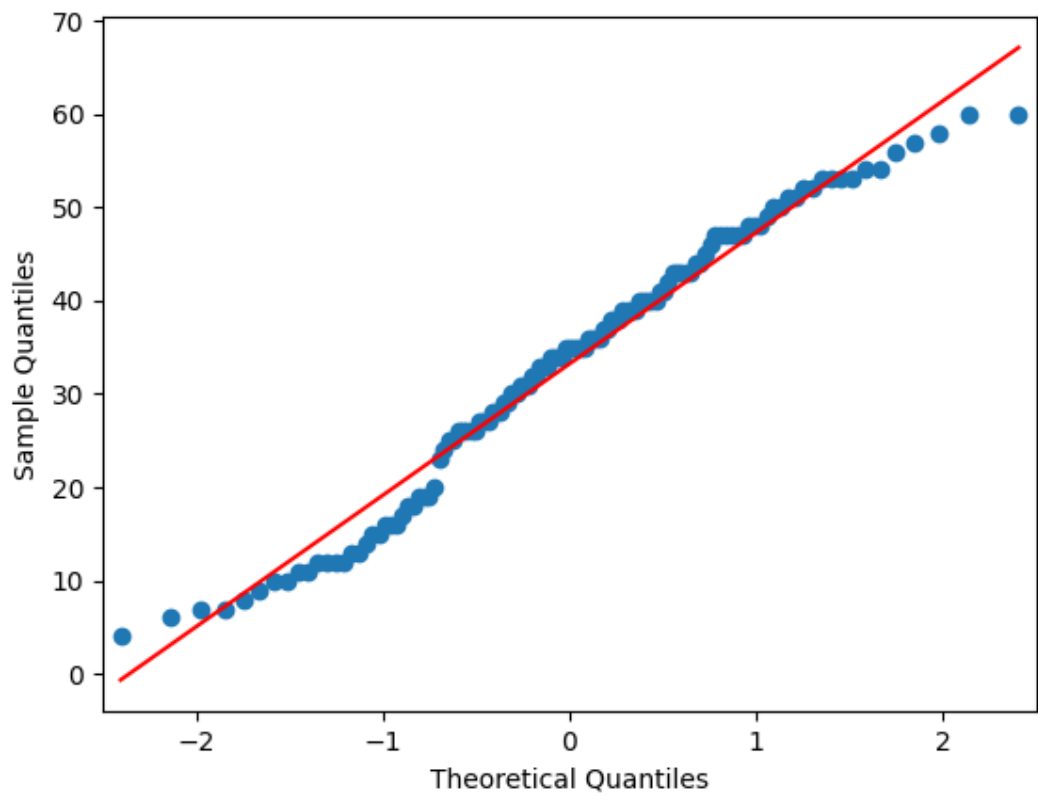
APPENDIX H

Figure 1

QQ plot for normality for male students
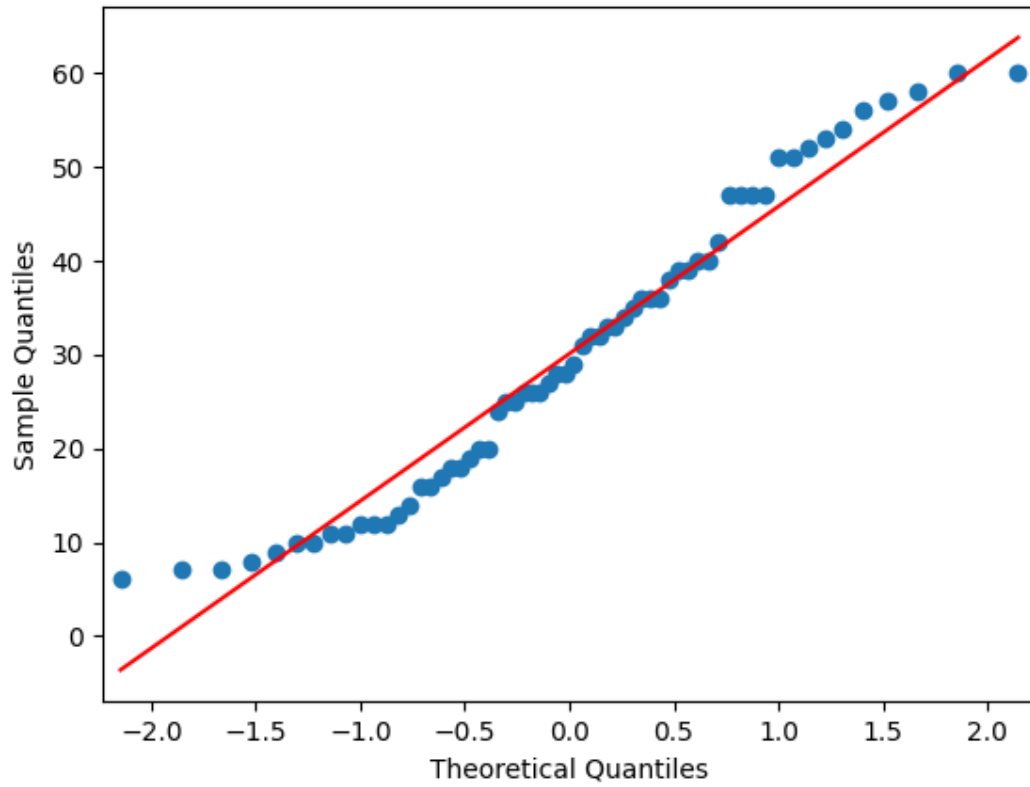
Figure 2

QQ plot for normality for female students
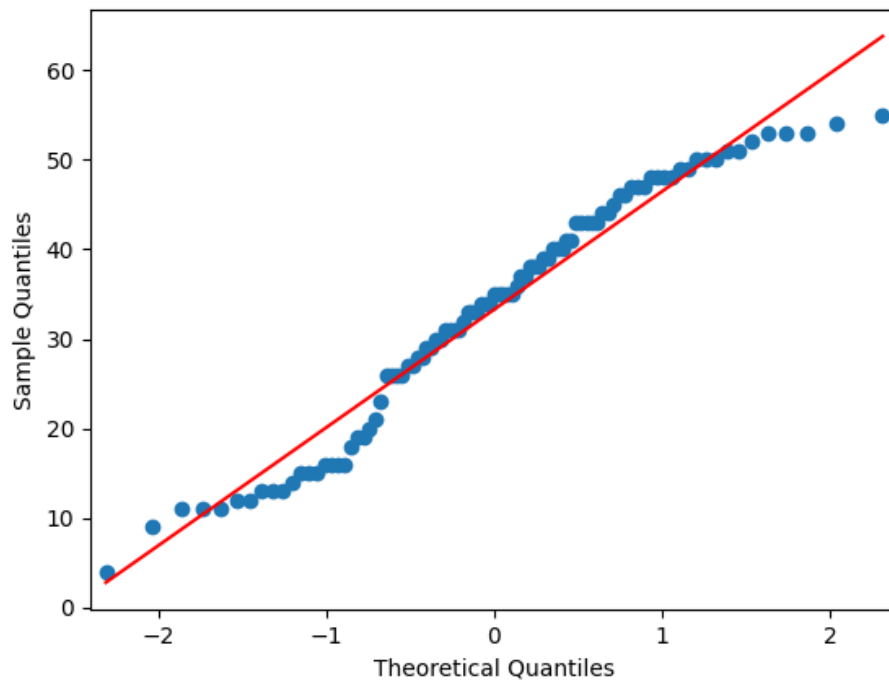
Appendix I

Figure 1

QQ plot for normality for With Family
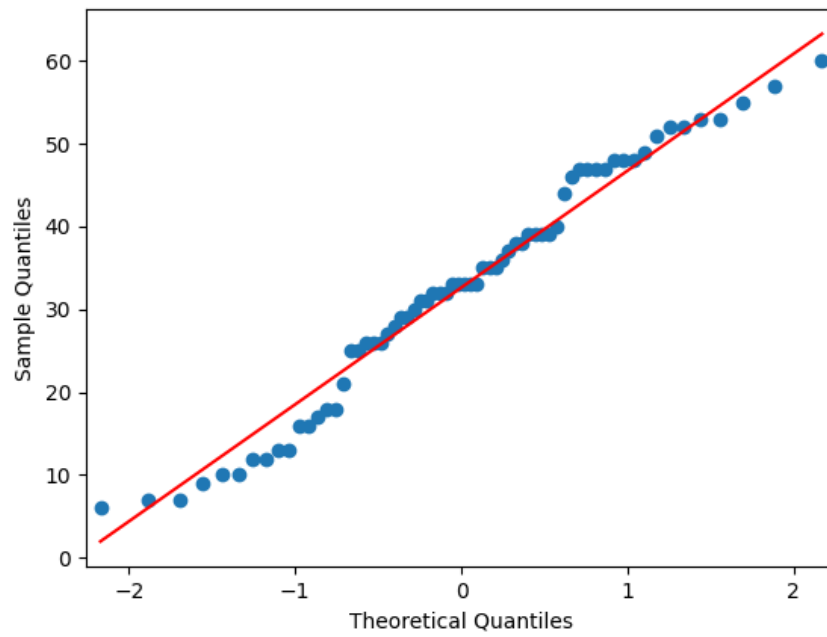
Figure 2

QQ plot for normality for Student Accommodation/Dorms
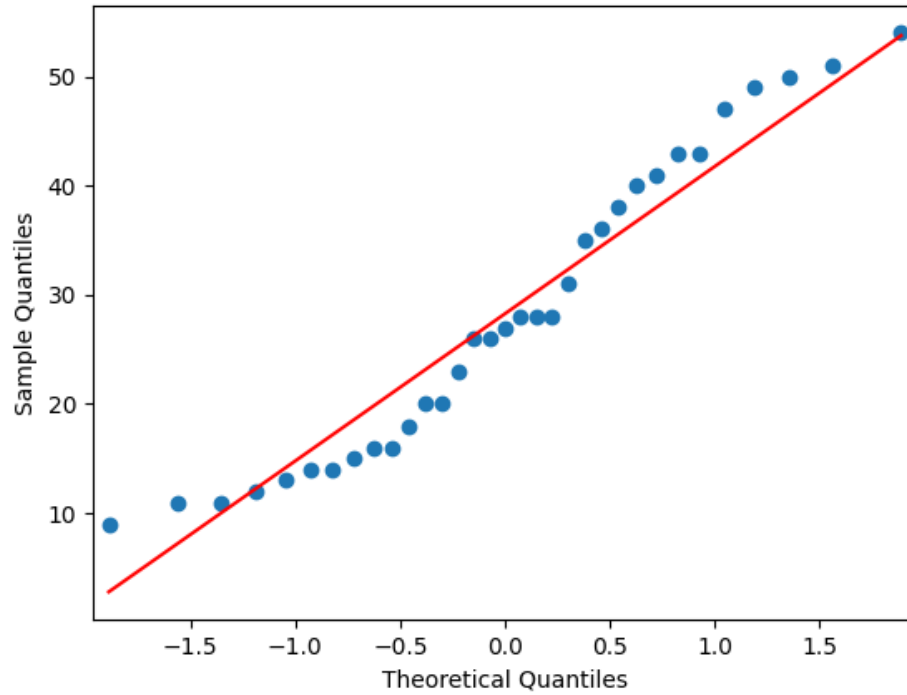
Figure 3

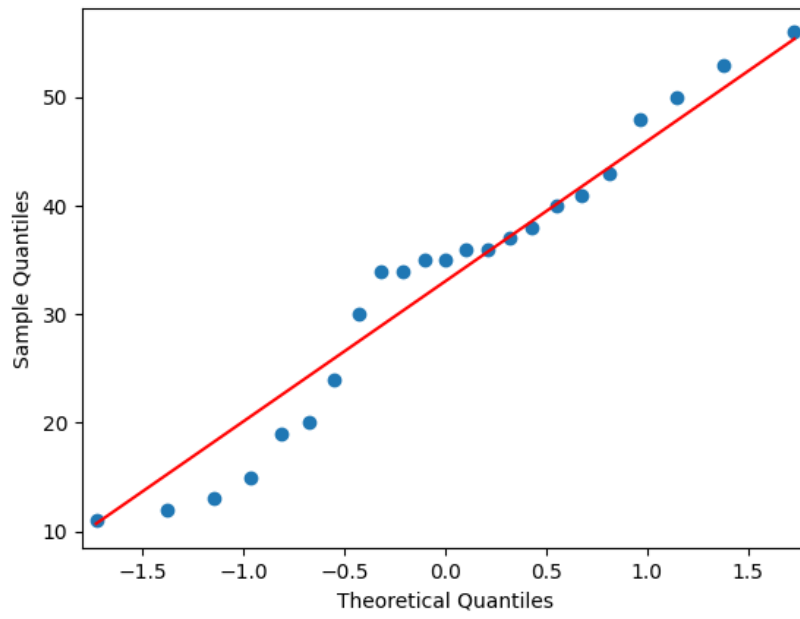*QQ plot for normality for Alone in a private residence*
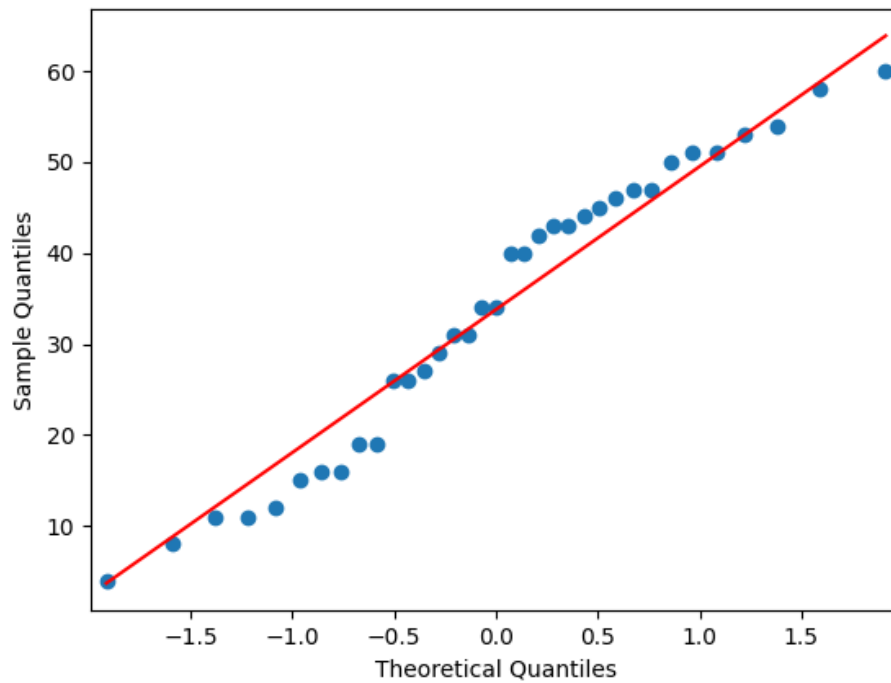
Figure 4

QQ plot for normality for Other residence

Appendix J

Assumptions plots for the linear regression with age
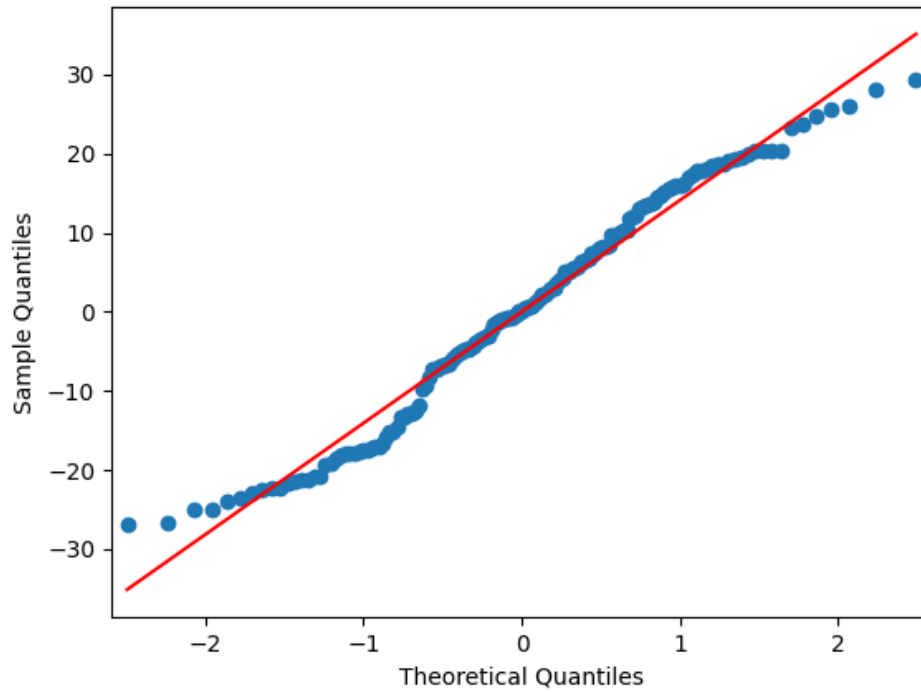
Figure 1

QQ plot for normality

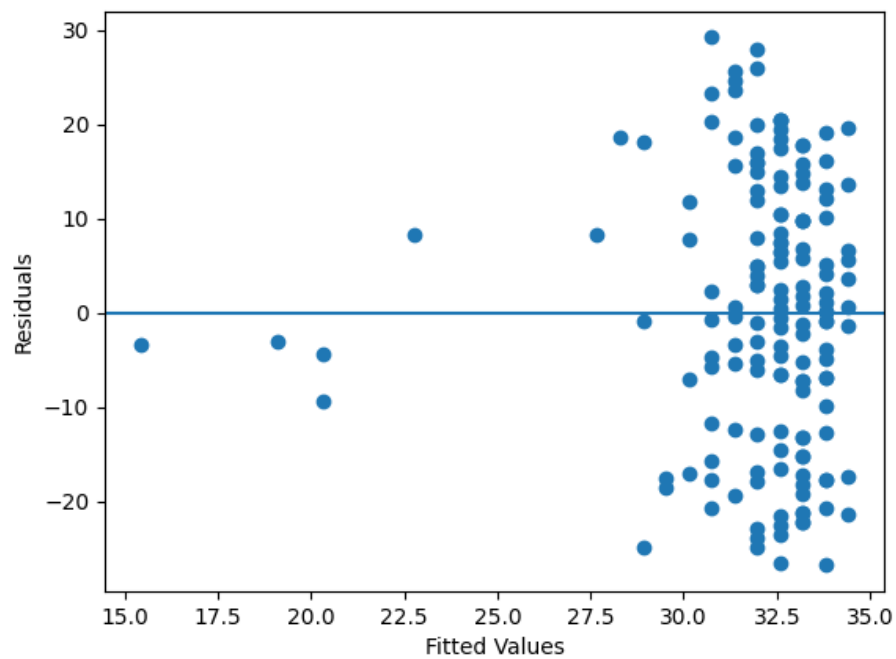**Figure 2**

Residuals vs fitted values for equality of variance

Figure 3

Cook's distance for influential points