12-4-2022

Mental Health and Academic Achievements

Priyangaa Rajendran
rajendrp@my.erau.edu

Sundareswar Selvaganesan
selvagas@my.erau.edu

Keren Natha
nathak@my.erau.edu

Vanessa Ng
jialingn@my.erau.edu

Mental Health and Academic Achievement

Vanessa, Sundar, Priyangaa, & Keren

Embry-Riddle Aeronautical University Asia

RSCH 202: Research Methods

Dr Shin Somi

27 November 2022

Abstract

Academic achievements are notoriously arduous for secondary school students to obtain, and they can be influenced by a range of factors such as stress, anxiety, and depression. This research seeks to provide insights into the relationship between academic achievements and the impact of mental health among secondary school students in Singapore. We conducted a cross-sectional study of 60 individuals who had previously completed academic examinations such as O-levels. A survey questionnaire with 15 questions was utilized to obtain primary data. The first section contained descriptive information on their age, gender, graduation year, and exam results. The second section contained ratings on their mental health before and during the exams, as well as input on areas for improvement. Finally, to analyze the data, secondary data descriptive statistics, a regression model, and we used a T-test for two samples with equal variances. The T-test results concluded that depression (P=0.90), stress (P=0.38), and anxiety (P=0.81) were all statistically insignificant prior to the examinations because they were all above the 5% significance level. Depression (P=0.24), stress (P=0.27), and anxiety (P=0.59) were all statistically insignificant during the tests since they exceeded the 5% significance level. As the T-test is statistically insignificant, we cannot reject the null hypothesis that academic achievements, such as O-levels, affect secondary school students' mental health.

Introduction

The increase in cases of mental health issues amongst youth and young adults in Singapore is a matter of concern and addressing these issues will be essential in helping them cope and transition to adulthood. In the Singapore Mental Health Study done in 2016, results showed that in Singapore, 1 in 7 people have experienced mental health issues and the highest is amongst the age group of 18 to 34 (IMH, 2022).

A past survey of 607 respondents of all ages was conducted by the People's Action Party youth wing also known as Young PAP. The plenary session and dialogues were led by Minister Chan Chun Sing, Sun Xueling and Dr Wan Rizal in March this year showed that 2 in 5 people have mental health issues and the most critical group wash those between the age of 15 to 35, as 1 in 2 people have mental health issues (Chong, 2022).Thus, there is a need to understand what the underlying factors are, to address, understand, improve, and better support mental health among youth and young adults in Singapore.

This research proposal aims to provide context regarding our research question on "How will academic achievements, such as O levels, affect the mental health of youth and young adults in Singapore's education system?". The null hypothesis is that academic achievements affect mental health, and the alternative hypothesis is that academic achievements do not affect mental health. In our research proposal, we have collected data via self-administered survey using cross-sectional study to measure and determine the relationship between academic achievements and mental health in students in Singapore. In order to measure the mental health, we asked participants to rate their mental health before and during the national exams, and to measure their academic achievements, we are asking the survey participants to select the range of their O-level or N-level score. O-levels and N-levels are national examinations in Singapore and the student's performance on these examinations determines their further education path. With the data collected from the survey, we performed T-test to determine if the depression, stress level, and anxiety levels make a difference in the aggregate score for O-levels. It showed that there were difference.

Thus, this research proposal, literature review on past works, contributions our study has made on top of existing studies, research methodologies, data analysis, and the results will be discussed.

Literature Review

Past work

While there has been a significant amount of research conducted to identify the connection between mental health and academic achievements, it has nearly always been to determine if mental health influences academic achievements. McLeod, Uemura, and Rohrman (2012) did a study on which mental health and behavioral problems have the strongest links with academic achievements in the future. Another study was done by Duncan, Patte, and Leatherdale (2021) to find out if mental illness symptoms and mental well-being are linked to educational behavior and secondary school grades. These were some examples of the sources we discovered that investigate the relationship between academic achievements and mental health in students. However, these studies focus on the effects of mental health on academic achievements. A study does attempt to determine whether academic performance impacts mental health, specifically in different periods of childhood (Agnafors, Barmark, & Sydsjö, 2020).

The most prevalent method of gathering data was through survey questionnaires or standardized tests. Approved mental health tests on depression levels and anxiety levels were given to the students to gain a better knowledge of their mental health. One study employed individual counseling sessions and recorded the changes in the student's grades before and after the session (Kivlighan, et. al., 2021). These studies were then able to compare the students' mental health data to their grades, analyze the data and arrive at a conclusion. They also analyzed and utilized secondary data to support their study. Secondary data was gathered from other studies, such as the National Longitudinal Study of Adolescent Health. Regression, as well as bivariant and multivariant analysis, were among data analysis methodologies used in previous research.

Contributions of our study

In our study, we focus on finding out if academic achievements affect the mental health of students instead of the effect mental health has on academic achievements. We want to find out if academic milestones, such as O-levels, have an effect on the stress, anxiety, and depression levels of students. While most past studies have focused on the effect that mental health has on academic achievements, we chose to study the effect of academic achievements on mental health.

Secondly, our study is focused on Singapore. We have observed that little to no studies are done to find the relation between academic achievements and mental health in Asia. Singapore is renowned for having one of the finest education systems in the world, as well as one that is very competitive. We wanted to find out if the strife to get good grades and do well makes a negative alteration in the mental health of students. Specific to Singapore, we use national examinations, such as GCE O-levels and N-levels, to represent academic achievements. Nearly every student in Singapore takes one of these examinations. These results are usually released between December and January. Students who have completed 4-5 years of secondary school will be eligible for O-levels and N-levels. The students must take a series of examinations for their chosen subjects, and the results are presented in a point-based system; where the lower the score, the better the student has done. We chose these national examinations since the students who take them are between the ages of 16 and 17 years old. This age group is referred to as young adults because they start to become increasingly independent and aware of their emotions and experiences.

While we also conducted a survey to collect data, we asked the participants to rate their stress, anxiety, and depression levels instead of using clinically approved tests, such as the GAD-7. In this test, participants are asked to rate the severity of each item over the past 2 weeks. However, our participants were not specifically involved in any major academic achievement in the past two weeks. Thus, the data collected from the use of those tests would

not be applicable to our research. Alternatively, we asked our participants to rate their depression, anxiety, and stress levels before and during their O-levels. They would then rate it from 1 to 10, with 1 being the lowest and 10 being the highest, based on their remembrance.

Variables, Measures, and Methodology

Dependent Variable

The dependent variable in our study is the mental health of secondary school students. In order to measure this variable, we ask the participants of our survey to rate their mental health before and during the national exams. They have to recollect the examination period and rate their depression, anxiety, and stress levels, on a scale of 0-10, with 0 being none and 10 being extreme. While other studies have used clinically approved tests such as GAD-7, we elected to have our participants rate it on their own basis. This is because tests like GAD-7 only examine the past two weeks. Our participants, on the other hand, all took the national exams at least a year ago. As a result, we asked them to rate it based on their recollection. Thus, we can use our survey to measure the mental health of secondary school students, in the form of rating their mental health before and during the national exams.

Key Independent Variable

The key independent variable is the academic achievement of secondary school students. In our study, we measure academic achievement based on the score of their O-levels and N-levels. O-levels and N-levels are national examinations that every 16- or 17-year-old must take in order to continue in their education path. Upon completion and depending on their score, the students are then able to graduate from secondary school to polytechnics or junior

colleges. The score is a combination of 4 to 5 of the students' best-scored subjects. The score can be 7 and above, but no more than 45. The lower the score is, the better the student has scored. In the survey, we divided the scores into ranges and ask the survey participants to pick their specific range. The ranges are 7 to 10 0, 11 to 14, 15 to 18, and 19 and above. Thus, through the survey we can measure the academic achievements of secondary school students in the form of national exam scores.

Control Variables

The control variables in our study are involved in Co-Curricular Activities (CCA), family issues, relationship issues, whether the student is currently working part-time, bullying, smoking and/or alcohol, and social media distractions. These are some other factors that can have a negative impact on secondary school students' mental health. We measure the control variables by asking the survey participants to tick every box that was relevant to them during their national examination period. We then offer them the 9 options, including others. We also have a follow-up question asking if being involved in these factors affected their overall score. Thus, we can measure if the students were affected by the control variables, and to which extent.

Population and Sample

The population that we are focusing on in this study is current and past secondary school students in Singapore. The selected sample size is students who have graduated from secondary school within the years of 2012 and 2021. That would put our demographic to 17-30-year-olds who have taken national examinations such as O-levels, or N-levels. Since we require the participants to choose the range of their scores, they must have taken the national examinations, meaning they must be 17 and above. We chose to cap the age limit at

30 as the survey required participants to recall back their emotions and feelings during the national examination period.

In our proposed research, we would like to get a sample size calculator to help us calculate the sample size as we continue to collect more samples. To collect more samples and have bigger sample data, we intend to send our survey to the first-year students of one polytechnic, one institute of technical education (ITE), one Junior College, and one University: Republic Polytechnic, Institute of Technical Education College West, Temasek Junior Colleges, and Singapore Management University. These students have more recently completed the examinations, and thus it will be fresh and easier for them to remember what it was like before and during since they have to rate their mental health.

Survey

We conducted the research study by using a survey questionnaire and asking students who have been or are currently in secondary school. Firstly, we divide the necessary variables and measures to better understand the research so that we can further our study. The independent variable will be academic achievements and the dependent variables will be the secondary school students' type of mental health problems like depression, anxiety, and stress levels. Together with that, there are many control variables that do affect the outcome and are not always significant to the research. Examples of the control variables are relationship troubles, bullying, alcohol consumption, social media, travel duration, gender, sexuality, and other responsibilities such as work employment.

We asked 15 questions in total, and the data collected was cross-sectional data. We asked about their gender, age group, the year they graduated from secondary school, their highest form of academic achievements, and the results they got for their O-level results. For those who had not done O- level but took a different route, such as N-levels, and continued their education path by going to Nitec and Higher Nitec studies, we have asked them to include

their N-level results instead. We also asked them to separately rank from 1 – 10 on how they felt before and during they took their exams according to different types of mental health issues like anxiety, stress, and depression. 0 being the best --with little to no depression, anxiety, or high stress – and 10 being the worst – with severely extreme depression, anxiety, or high stress. We used the control variables and asked them whether they were affected by any of them and their results. We also asked if they have ever gone to the extent of contemplating suicide. At the end of the results, we asked for their feedback on what could be done during that period.

Data Analysis

Data Analysis

After collecting the data from the survey, we did a T-test: Two samples Assuming Equal Variances by examining the different ranges of aggregate scores and the rankings of each type of mental health problem before and during the O-level examinations as our preliminary results. We used hypothesis testing to determine our final results. The null hypothesis is that academic achievements, such as O levels, affect the mental health of secondary school students. The alternative hypothesis is that academic achievements do not affect the mental health of these students.

t-Test: Two-Sample Assuming Equal Variances

Depression (Before)	*High Score*	*Low Score*
Mean	3.62962963	3.739130435
Variance	11.31908832	6.565217391
Observations	27	23
Pooled Variance	9.140230811	
Hypothesized Mean Difference	0	
df	48	
t Stat	-0.127643742	
P(T<=t) one-tail	0.44948209	
t Critical one-tail	1.677224196	
P(T<=t) two-tail	0.89896418	
t Critical two-tail	2.010634758	
Total Depression (B) Mean	3.68	

t-Test: Two-Sample Assuming Equal Variances

Stress Level (Before)	*High Score*	*Low Score*
Mean	5.888888889	6.608695652
Variance	8.41025641	7.976284585
Observations	27	23
Pooled Variance	8.211352657	
Hypothesized Mean Difference	0	
df	48	
t Stat	-0.885256998	
P(T<=t) one-tail	0.190215695	
t Critical one-tail	1.677224196	
P(T<=t) two-tail	0.380431391	
t Critical two-tail	2.010634758	
Total Stress Level (B) Mean	6.22	

t-Test: Two-Sample Assuming Equal Variances

Anxiety (Before)	*High Score*	*Low Score*
Mean	5.740740741	5.52173913
Variance	9.968660969	9.624505929
Observations	27	23
Pooled Variance	9.810923242	
Hypothesized Mean Difference	0	
df	48	
t Stat	0.246407071	
P(T<=t) one-tail	0.403208935	
t Critical one-tail	1.677224196	
P(T<=t) two-tail	0.80641787	
t Critical two-tail	2.010634758	
Total anxiety level (B)	5.848484848	

Figure 1

The T-test before the O-level examinations, shown in Figure 1, shows that for Depression, Stress level, and Anxiety, there is no difference between the mental health problem and the range of aggregate score as all of its P-value is higher than the 5% significance level regardless of their aggregate scores.

t-Test: Two-Sample Assuming Equal Variances

Depression (During)	*High Score*	*Low Score*
Mean	3.333333333	4.3913043
Variance	10.46153846	9.5217391
Observations	27	23
Pooled Variance	10.0307971	
Hypothesized Mean Difference	0	
df	48	
t Stat	-1.177244972	
P(T<=t) one-tail	0.122451157	
t Critical one-tail	1.677224196	
P(T<=t) two-tail	0.244902315	
t Critical two-tail	2.010634758	
Total Depression (D) Mean	3.82	

t-Test: Two-Sample Assuming Equal Variances

Stress Level (During)	*High Score*	*Low Score*
Mean	6.888888889	7.3043478
Variance	4.487179487	6.5849802
Observations	27	23
Pooled Variance	5.448671498	
Hypothesized Mean Difference	0	
df	48	
t Stat	-0.627254219	
P(T<=t) one-tail	0.266732568	
t Critical one-tail	1.677224196	
P(T<=t) two-tail	0.533465136	
t Critical two-tail	2.010634758	
Total Stress Level (D) Mean	7.08	

t-Test: Two-Sample Assuming Equal Variances

Anxiety (During)	*High Score*	*Low Score*
Mean	6.925925926	6.5217391
Variance	4.763532764	9.1699605
Observations	27	23
Pooled Variance	6.783145464	
Hypothesized Mean Difference	0	
df	48	
t Stat	0.546924469	
P(T<=t) one-tail	0.29348222	
t Critical one-tail	1.677224196	
P(T<=t) two-tail	0.586964439	
t Critical two-tail	2.010634758	
Total Anxiety (D) Mean	6.74	

Figure 2

While the T-test during the O-level examinations, as shown in Figure 2, shows that there is no difference between the type of mental health problems and the range of aggregate scores, as all the P-values are higher than the 5% significance level. Thus, from both Figures 1 and 2, we can state that we do not reject the null hypothesis where academic achievements, such as O levels, affect the mental health of secondary school students as the T-test is statistically insignificant.

In our proposed data, we will be using regression analysis to focus more on how the control variables contribute to our study. The equation of the regression analysis would be Academic Achievements = $\beta_0 + \beta_1$CCA+ β_2 Family Issues + β_3 Relationship Issues + β_4 Part-time jobs + β_5 Bullying + β_6 Smoking and/or Alcohol + β_7 Social media + β_8 Others + Residual. This will help us broaden our study and give us a deeper look at which control variable mostly affects the academic achievements of secondary school students.

Limitations of our study

There were many limitations regarding this survey as we have an aim to what we wanted to gain from this study. In Singapore, most students above 17, would have experience taking the national examinations. However, many of them may be satisfied with their results. Therefore, the people who have taken the survey may have lied about their responses, especially about their aggregate scores. They may have also had a different perception of their rating of mental health from another person. Even though the scale might appear differently for everyone, our study still examines the person's mental well-being. Thus, regardless of the results, we still get to understand of stress, anxiety, or depression they felt before or during the examinations. Their recollection may not be accurate as some of them would have taken the exams a long while ago. Not only that, but the preliminary results data also that we collected was from our family and friends which shows that the sample size was biased. In our proposed data, even though we are going to send our surveys to Polytechnic, ITE, Junior College, and University students, it can still be identified as biased too. This is because it is easier for us to get in contact with them as we do have an easier connection with them as some of us are able to contact our previous lecturers from there to help us to send over the surveys to the students. However, it does give us a great chance to have a bigger sample size to carry out the research.

Conclusion

All in all, we used the before and during examinations rating scales of mental health because it contributes to what we were trying to find, which is how much academic achievements affect mental health. Our findings suggested that academic achievements affect the mental health of many secondary school students though there were limitations to the data we collected. Our research study demonstrates that there is an opportunity to enhance the attention of students facing mental health issues and there are approaches we can find to

help overcome them. Thus, with these preliminary results, we do propose expanding our study by collating larger sample sizes from polytechnics, institutes of technical education, junior colleges, and universities to gain a greater understanding at how academic achievements affect the mental health of secondary students taking the national examinations.

References

Agolla, J., Ongori, H. (2009). An assessment of academic stress among undergraduate students: The case of the University of Botswana. *Educational Research and Review*, *4*(2), 63–70. http://www.academicjournals.org/ERR

Agnafors, S., Barmark, M., & Sydsjo, G. (2021). Mental Health and Academic Performance: A Study on Selection and Causation Effects from Childhood to Early Childhood. *Social Psychiatry and Psychiatric Epidemiology*, 56, 857-866. https://doi.org/10.1007/s00127-020-01934-5

Bas, G. (2021, January 20). *Relation between Student Mental Health and Academic Achievement Revisited: A Meta-Analysis | IntechOpen*. Relation Between Student Mental Health and Academic Achievement Revisited: A Meta-Analysis | IntechOpen. Retrieved October 25, 2022, from https://www.intechopen.com/chapters/74883

Chong,C. (2022). Survey finds 2 in 5 S'poreans have mental health struggles; initiative lauched to drive action. https://www.straitstimes.com/singapore/survey-finds-2-in-5-sporeans-have-mental-health-struggles-new-initiative-launched-to-drive-action

Duncan, M. J., Patte, K. A., & Leatherdale, S. T. (2021). Mental Health Associations with Academic Performance and Education Behaviors in Canadian Secondary School Students. Canadian Journal of School Psychology, 36(4), 335–357. https://doi.org/10.1177/0829573521997311

IMH. (2202). *IMH launches its first comprehensive nationwide study to assess the state of mental health among youth in Singapore. SMHS.* https://www.imh.com.sg/Newsroom/News-Releases/Documents/SMHS%202016_Media%20Release_FINAL_web%20upload.pdf

Jeffries, V. & Salzer, M. S. (2021). Mental Health Symptoms and Academic Achievement Factors. *Journal of American College Health,* 1-4. https://doi.org/10.1080/07448481.2020.1865377

Kivlighan, D. M. III, Schreier, B. A., Gates, C., Hong, J. E., Corkery, J. M., Anderson, C. L., & Keeton, P. M. (2021). The role of mental health counseling in college students' academic success: An interrupted time series analysis. Journal of Counseling Psychology, 68(5), 562–570. https://doi.org/10.1037/cou0000534

McLeod, J. D., Uemura, R., & Rohrman, S. (2012). Adolescent Mental Health, Behavior Problem, and Academic Achievement. *Journal of Health and Social Behavior,* 53(4), 482-97. https://doi.org/10.1177/0022146512462888

Wyatt, T., Oswalt, S., Ochoa, Y. (2017, June 20). Mental Health and Academic Performance of First-Year College Students. *International Journal of Higher Education*, *6*(3), 178–187. https://doi.org/10.5430/ijhe.v6n3p178

Appendix A – Survey Questionnaires

Q1

Hi, we are students from Embry-Riddle Aeronautical University, Asia and we are researching mental health during secondary school years. This survey is completely anonymous and takes about 3 minutes. Thank you for your time and honesty !!

Q2 *

Gender

- Male
- Female
- Non-binary

Q3 *

Age

- 13 - 16
- 17 - 20
- 21 - 25
- 26 - 30

Q4 *

Which year did you graduate from secondary school?

Q5 *

What is your highest form of academic achievement?

- O/N Levels
- Nitec / Higher Nitec
- Diploma / A Level
- Degree & higher

Q7 *

Did you take O or N levels? (If you did both, please choose O levels)

- O Levels
- N Levels

Q6 *

What was your aggregate O Levels score? (excluding CCA points)

- 7 - 10
- 11 - 14
- 15 - 18
- 19 and above

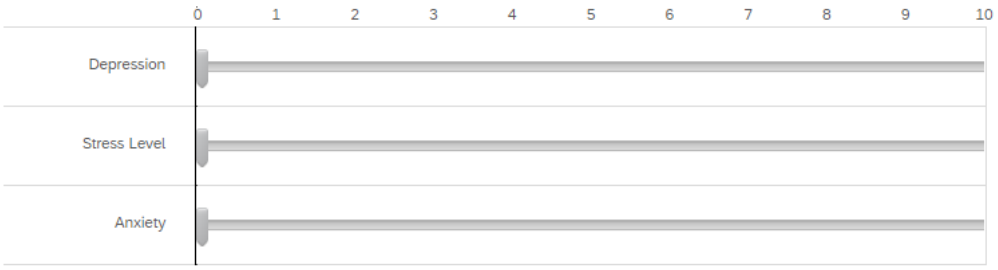
Q9 ✶

What was your aggregate N Levels score? (excluding CCA points)

- ○ 7 - 10
- ○ 11 - 14
- ○ 15 - 18
- ○ 19 and above

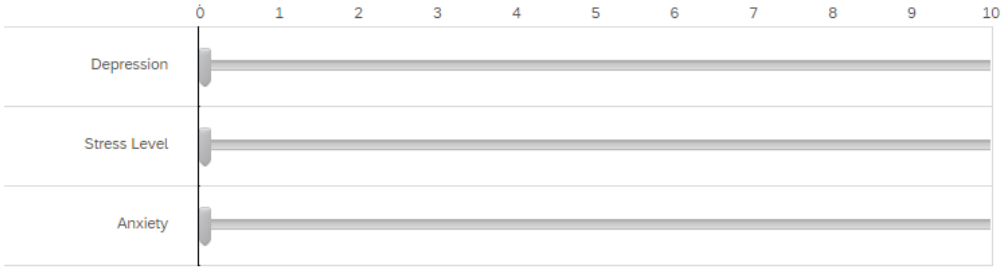
☐ Q10 ✶ •••

On a scale of 1-10, rate your mental health **before** the National exams.



Q14 ✶

On a scale of 1-10, rate your mental health **during** the National exams.



Q16 ✶

Were there any instances where you contemplated suicide?

- ○ Yes
- ○ No
- ○ Prefer not to say

☐ Q11 ✶ •••

Select what was relevant at that period of time. (Multiple options)

- ☐ Family Issues
- ☐ CCA
- ☐ R/S Issues
- ☐ Part-time job
- ☐ Smoking/Alcohol
- ☐ Distractions from social media
- ☐ Bullying
- ☐ Others

Q12 *

Did these issues impact your overall score?

- ○ Yes
- ○ No

☐ Q13 * •••

What could have made this process better for you? (eg. counseling, breaks, workshops)