Restriction Policy Data Analysis

August 2021

1 Abstract

COVID-19 has been one of the most impactful epidemics of this century and has had significant impacts both directly and indirectly on the population. The aim of this study was to look at UNSW students' attitude towards the NSW government's handling of the COVID-19 and to determine if there were any underlying factors influencing their attitudes. The survey methodology was based on convenience sampling (specifically voluntary sampling method) and responses were collected through Google forms. Principal component analysis found that there existed a total of 7 factors that cumulatively accounted for 71% of total variation which included COVID Strategy, preventative methods, government travel restrictions, lifestyle, health restrictions, health concerns and employment concerns. Hierarchical cluster analysis was subsequently used to create a dendrogram where 2 clusters were identified and further non-hierarchical cluster analysis was conducted through K-means. Analysis of the cluster means resulted in inferences regarding two groups called 'Health Conscious' and 'Risk Takers'. It was found that that the majority of the low satisfaction towards the NSW government were due to reasons surrounding financial support for families and businesses as well as a lack of enforcement of COVID-19 rules. These results can be used to explore the attributes and satisfaction towards the NSW government and will help the government understand the public's perspective of their current COVID-19 strategy.

2 Introduction

NSW is currently going through its strictest lockdown yet as a result of COVID-19 as at July/August 2021. The switch to online learning has undoubtedly caused a change in the way UNSW students complete their coursework and obtain their degree.

As a result, it is of interest to us to explore what the attitudes of UNSW students' toward the NSW government's handling of COVID-19 is. In particular, our study aims to identify general trends in UNSW student perceptions towards government imposed COVID-19 restrictions such as travel restrictions, financial support and overall attitude towards the NSW government's handling of COVID-19.

A second facet of our study aims to identify if there are certain underlying constructs that influence the attitude of UNSW students in regards to the NSW government's COVID-19 response with an aim to interpret and state what these constructs are.

Thus, the research question was:

What are UNSW students' attitudes toward the NSW government's handling of the COVID-19? Are there any underlying factors that influence their attitude?

3 Survey Method

The survey methodology was conducted via volunteer sampling which is a subset of convenience sampling. This was deemed the most appropriate strategy in our case due to time constraints. Administration of the survey was done through Google Forms, which was posted into groups such as 'UNSW Discussion Group' and sent to friends currently attending UNSW. To ensure that our target population was sampled, screening questions were used at the start of the survey that asked if the student currently attended

Group' and sent to friends currently attending UNSW. To ensure that our target population was sampled, screening questions were used at the start of the survey that asked if the student currently attended UNSW and if they currently resided in NSW. If the respondent answered 'No' to either of these questions, the survey automatically concluded and their response was not considered in subsequent data analysis.

Once an adequate number of responses was gathered, data analysis was conducted with factor analysis followed by cluster analysis.

4 Factor Analysis

The aim of factor analysis was both exploratory analysis to determine the underlying concepts that influence the attitudes of UNSW students towards the government's handling of COVID-19 and explanatory analysis to determine which questions contribute to these underlying concepts. This information would allow the NSW government to understand the different latent variables that influence the attitude of typical university students towards their COVID response and focus on these factors as areas for improvement.

Firstly, the data set of responses was cleaned to ensure that invalid responses were removed. String variables from open ended questions were removed as SPSS only allowed numeric variables for factor analysis. As a result, 21 items were considered for factor analysis.

Secondly, the cleaned data was imported into SPSS and a principal components analysis (which is a form of factor analysis) was done. In principal components analysis, interrelated variables (in our case questions) are transformed into a set of unrelated linear combinations of these variables. Feasibility of factor analysis was first measured through the KMO index and Bartlett's test. The number of factors extracted was done by examining the Scree plot and latent roots criterion which SPSS automatically derives by including any factor with an eigenvalue greater than 1, indicating that the factor is above average at explaining variation. To aid with interpretation, we have used Varimax rotation (multiplying the matrix of factor loading's with an orthogonal matrix) as this forces factor loading's on the items to be close to either 0 or 1.

Feasibility of factor analysis was deemed above middling based on the KMO index of 0.723. Additionally, Bartlett's test has a significance of 0 to 3 decimal places suggesting that there is evidence of correlation patterns which are worth exploring.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.723
Bartlett's Test of Sphericity	Approx. Chi-Square	665.736
	df	210
	Sig.	.000

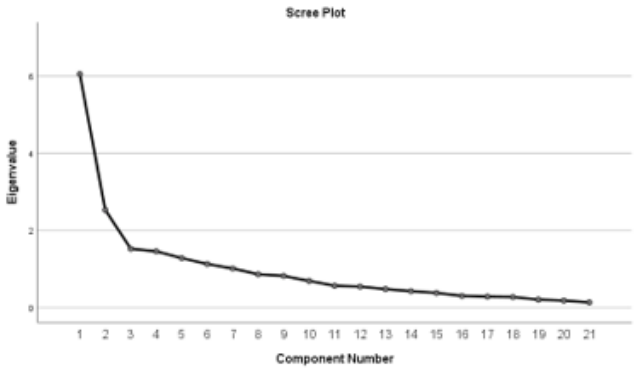

Figure 1: KMO Index and Bartlett's Test, and Scree Plot.

The number of factors included in our principal components analysis was first determined by examining the Scree Plot seen in figure 1, however, due to a lack of a clear scree we turned to the latent roots

criterion instead for a more robust determination of factor inclusion. Based on the latent roots criterion, the number of factors included was 7. These factors cumulatively account for 71.179% of variation in our data.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.049	28.807	28.807	6.049	28.807	28.807	3.146	14.983	14.983
2	2.524	12.018	40.825	2.524	12.018	40.825	2.797	13.319	28.302
3	1.519	7.232	48.056	1.519	7.232	48.056	2.789	13.281	41.584
4	1.452	6.914	54.971	1.452	6.914	54.971	2.169	10.330	51.914
5	1.274	6.069	61.039	1.274	6.069	61.039	1.462	6.963	58.876
6	1.124	5.351	66.390	1.124	5.351	66.390	1.353	6.445	65.321
7	1.006	4.790	71.179	1.006	4.790	71.179	1.230	5.858	71.179
8	.855	4.073	75.252						

Figure 2: Latent Roots Criterion.

Communalities were also assessed to identify any items that were poorly represented by the 7 factors selected. Although one item had a poor communality of 0.416, we deemed this item important to our research question and made the decision to leave it in for analysis. All other items had adequate communalities (> 0.6). For a full list of communalities, see appendix 8.1.

Based on Varimax factor loadings (Appendix 8.2), items with a significant loading (> 0.3) were extracted. Items with multiple significant loadings were considered component candidates for elimination. Considering the purpose of our research and the components the items have loaded on, we have eliminated the item 'In your view, are vaccinations effective at preventing the spread of COVID-19?' but have kept all other items.

Below we outline each component, the items that have loaded on these components and their interpretation.

Component 1: COVID Strategy

- To what extent has the NSW Government enforced the current COVID-19 restrictions?
- To what extent has the NSW population abided by the COVID-19 restrictions?
- How would you rate the level of support given by the NSW Government to families and individuals?
- How would you rate the level of support given by the NSW Government to small businesses?
- To what extent are you satisfied with the NSW government's handling of COVID-19?

Component 2: Preventive Measures

- Temperature checks to detect whether an individual has COVID-19.
- Compulsory QR codes outside places of business.
- Making the spread of COVID-19 misinformation an offence.

Component 3: Travel Restrictions

- In your view, how safe are COVID-19 vaccines?
- To what extent is restricting the number of people at social gatherings effective at preventing the spread of COVID-19?
- To what extent has inter-state travel restrictions helped the NSW government in controlling COVID-19 cases in NSW?
- To what extent has International travel restrictions helped the NSW government in controlling COVID-19 cases in NSW?

- To what extent has the 14-day quarantine policy for Australians arriving home from overseas been at controlling the spread of COVID-19 in NSW?

Component 4: Lifestyle

- How have Government-imposed COVID-19 restrictions impacted your daily life?
- To what extent are lockdowns effective at preventing the spread of COVID-19?
- To what extent are social distancing measures effective at preventing the spread of COVID-19?

Component 5: Health Restrictions

- To what extent are face masks effective at preventing the spread of COVID-19?

Component 6: Health Concerns

- How significant of a threat do you believe contracting COVID-19 would be to your health?

Component 7: Employment Concerns

- To what extent has your work been impacted by COVID-19?
- How interested are you in NSW state and local politics?

4.1 Reliability Analysis

A minimum of 5 subjects is desirable per variable for factor analysis, and as we included 21 items in our factor analysis, our sample size should have been 105 (5 subjects × 21 items). However due to a lack of time, only 76 responses were gathered. As a result, questions of reliability with each derived component arise. In order to assess this, we conducted a reliability analysis on SPSS.

Reliability Statistics

Cronbach's Alpha	N of Items
.785	21

Figure 3: Cronbach's Alpha.

The overall Cronbach's alpha was 0.785. This is greater than 0.7 which is the benchmark for psychological constructs which our survey relies on (see 6.3 Existing Literature). Hence, our survey construct is considered to be reliable overall.

Next, we individually examined each item through an item-total statistic table (appendix 8.3). Based on this analysis the following items were deemed unreliable:

Question	Reason
How have Government-imposed COVID-19 restrictions impacted your daily life	Corrected item-total correlation of -0.004, and an increase of Cronbach's alpha to 0.804 if item deleted.
To what extent has your work been impacted by COVID-19?	Corrected item-total correlation of -0.284, and an increase of Cronbach's alpha to 0.839 if item deleted
To what extent are face masks effective at preventing the spread of COVID-19?	Corrected item-total correlation of 0.156, and an increase of Cronbach's alpha to 0.786 if item deleted
How interested are you in NSW state and local politics?	Scale mean if item deleted differs from other items, a corrected item-total correlation of 0.024, and an increase to Cronbach's alpha to 0.797 if item deleted

As a result, the reliability of component 5 and component 7 are brought into question as all the items under these components are deemed unreliable based on the above analysis.

4.2 Conclusion

Going back to our study's aim in using factor analysis, for exploratory analysis, we can now answer the part of the research question that asks 'Are there any underlying factors that influence attitude?'. Based on the above factor analysis and subsequent reliability analysis, we have deemed there to be at least 5 reliable factors (the initial 7 factors less the 2 unreliable factors) that influence UNSW students attitudes towards the NSW government's handling of COVID. These include COVID strategy, Preventive Measures, Travel Restrictions, Lifestyle and Health Concerns. Based on our explanatory factor analysis, questions that the NSW government can ask to evaluate these different factors are outlined under each component on page 3.

5 Cluster Analysis

Cluster analysis is a useful tool that will allow the NSW government to segment the population into groups with similar characteristics. The government can use these clustered groups to assess the effectiveness of their current COVID-19 strategy and identify ways to to improve the satisfaction of the clustered groups through the responses gathered from the survey.

We classified the individuals who responded in our survey through the means of their responses to the questions of our five components outlined in factor analysis.

In order to decide the initial cluster number, we performed hierarchical clustering in the form of agglomerate clustering. This is where each response is placed in a separate cluster, then these clusters increase in size by combining them with other clusters until a single cluster is formed containing all the responses. To conduct this we used Ward's linkage procedure where the squared Euclidean distance to the mean is calculated. The objects with the smallest increase in the overall sum of square are combined. In order to produce our clustering results, we used a dendrogram (Appendix Figure 5). It is clear that in the last two stages, the distances at which the clusters are being combined are large. Hence we can conclude that our initial clustering solution is 2. We can use this solution as inputs to the non-hierarchial, k-means clustering. Non-hierarchal clustering works best when a large number of observations is classified into a few clusters since it is near the "top".

5.1 Diagnosis

In order to verify the results from the dendrogram and ensure we have chosen the optimal amount of clusters, we also utilised 3 diagnosis tools using RStudio.

WSS Method - Also known as the 'Elbow Method". This method looks at the total within-cluster sum of squares (WSS) against the number of clusters. We then observe the graph to select a point where there is bend in the curve which typically indicates the optimal number of clusters. (Appendix Figure 10)

Average Silhouette Method - The silhouette method measures how good each point of data lies within clusters where a high silhouette value indicates a good cluster. It then averages the silhouette values over k-numbers of clusters and selects the amount of clusters with the highest average. (Appendix Figure 11)

NbCluster package - A package on R which helps determine the optimal clusters through a variety of procedures such as combinations of number of clusters, distance measures, and clustering methods (Appendix 8.7).

Based on the dendrogram and diagnosis tools used to verify it, have confirmed the optimal number of clusters to be 2 and utilised this result for k-means clustering (Appendix Figure 12 and Figure 13).

5.2 Results

Using the pre-specified 2 clusters we determined from previous hierarchical methods and diagnosis, we were able to produce the below results using k-means clustering in R. Of note is that the results reported have been normalized to a mean of 0 and variance of 1. We normalised these variables to put the

variables on a common scale. Moreover, leaving our components with unequal variances causes clusters to be separated along larger variances, which in turn introduces bias towards particular features.

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K-means clustering with 2 clusters of sizes 16, 60

Cluster means:
    Strategy Preventive     Travel  Lifestyle H. Concerns
1 -0.8565288 -1.2308618 -1.2960184 -1.4588262  -1.2202582
2  0.2284077  0.3282298  0.3456049  0.3890203   0.3254022
```

Figure 4: Scaled K-Means Cluster Scores

From this we could observe that there were two kinds of individuals we surveyed: Risk Takers (cluster 1) and Health Conscious (cluster 2).

5.2.1 Risk Takers

Representing 21.05% of our complete responses, we observe that their health concerns regarding COVID-19 had a mean of -1.22, which is significantly lower than the average of zero.
In our opinion there are two main reasons why they have a lower health concern:

- They are a group of the population who are willing to take risks. As a result, they are more likely to carry on with their daily life unaffected by the health risks of COVID-19
- Living in an environment where there is a low risk to being exposed to COVID-19

As a result, we could observe that there was a much lower favourability of the 4 other components of the NSW government's response to COVID-19 compared to the total average.

5.2.2 Health Conscious

Representing 78.95% of our complete responses, we could see these individuals were above average regarding their concern about COVID-19 having a serious impact on their health with a mean of 0.32. We also note that they are much more supportive of COVID-19 guidelines than our *Risk Takers* cluster. There are four reasons that could explain this:

- They have underlying health problems such as a low immune system, asthma or heart problem, that can cause them to be extremely susceptible to COVID-19.
- They personally know an individual that has contracted COVID-19.
- They could be living in a high risk zone such as south-west Sydney, that could increase the probability of them contracting COVID-19.
- Their lifestyle is at a higher risk due to reasons that could be due to their type of work e.g. first responders or essential services.

5.2.3 Comparison between Risk Takers and Health Conscious

To compare our two clusters effectively, let us calculate the difference in means of the five components: From this table, we observe that:

Component	COVID Strategy	Preventive Measures	Travel Restrictions	Lifestyle Measures	Health Concerns
Difference in means	1.0849	1.5590	1.6416	1.8479	1.5457

- There was an overall trend that individuals from the *Risk Takers* cluster had a lower average mean for all 5 categories than the individuals from the *Health Conscious* cluster.
- The largest difference in means between our two clusters occurred for lifestyle measures whilst the smallest difference in means was for COVID strategy.

Additionally, we observe from our K-means clustering plot (shown in Appendix 8.6) that:

- There are two clear clusters with no overlap.
- Our observations in the *Risk Takers* cluster were much more spread out (larger distances) compared to our *Health Conscious* cluster. This indicates that there might be large differences in opinion of the *Risk Takers* towards each of the five factors we have outlined above. This is opposed in our *Health conscious* in which distances between each observation was small, suggesting there are similar attidudes and concerns towards the NSW government's handling of COVID-19 among individuals within the cluster.

6 Discussion

6.1 Sampling Difficulties

We recorded 79 responses from our survey. Of those 79 responses, 3 of them were rejected since they didn't belong to our target population. As a result, we recorded 76 complete responses in our survey. Thus our survey had a response rate of 96.2%. As volunteer sampling was used and surveys were administered online through google forms, there was no difficulty in administering the survey.

6.2 Improvements for Next Time

If given more time, we would have liked to allocate a longer period for collecting responses for our survey. This would have been beneficial to provide statistical significance to our data analysis, as in methods like factor analysis, loading's larger than 0.3 have statistical/practical significance for sample sizes greater than 100. However, due to the nature of the task, we had to get responses in a quick way over the internet (via google forms) and therefore did not collect as much data as we would have liked to. In addition, if a different surveying procedure was used (discussed in subsection 6.4), we could validate whether the responses in our survey belonged to our ideal target population, hence we may or may not have introduced inherent bias into our current survey analysis as we couldn't validate each of the responses, this is obviously problematic.

In terms of the data analysis, as k-means is sensitive to ordering of our data (based on initial cluster locations), if given the time, averaging out results of consecutive k-means implementations with randomized order each time is much more suitable for accurate results. Furthermore, in factor analysis, questions were grouped with components which were in regards to a different topic of interest, this made it difficult to interpret components as their meaning was vague. In the future we would suggest adding new features which are combinations of existing ones in order to remove correlation.

6.3 Existing Literature

A study by Klas et al. (2021)[1] aimed to identify if there were sub factors that influenced Australian's response to COVID and government restrictions. Their findings showed that an individuals level of 'Submission' could positively predict their perceived threat of COVID and thus their support for government restrictions. The converse was true for 'Conventionalism' and 'Anti-Egalitarianism' which negatively predicted perceived threat of COVID and thus support for government restrictions. Our study's factor analysis showed that a UNSW students attitude towards NSW government restrictions (such as attitude

[1]Klas, A., Dyos, E., Clarke, E., 2021, "The Role of Ideological Attitudes in Responses to COVID-19 Threat and Government Restrictions in Australia", ScienceDirect, vol. 175

towards travel restrictions and health restrictions) were the underlying factors that determined their attitude towards the NSW governments handling of COVID. Thus, relating this to the study by Klas et al. it may be that the factors we have derived are actually composed of sub factors such as one's personality traits and ideologies i.e. level of submission and support for anti-egalitarianism. These sub factors may be what determines support for various NSW government COVID restrictions which in turn determines a UNSW students attitude towards the NSW governments handling of COVID.

Our cluster analysis results can be related to research done by done by Faasse and Newby (2020)[2] which examined public perceptions towards COVID-19 in Australia. Their results found that those engaging in health protective behaviours were more likely to have followed mainstream media and perceived COVID-19 as dangerous. As cluster 2 had a higher mean for all components relative to cluster 1, we can deduce that at least part of the reason for this cluster having more support for component 1 (COVID strategy), component 2 (Preventive Measures) and component 3 (Travel Restrictions) is due to their stronger belief in the danger of COVID as represented by the high mean in component 6 (Health Concerns).

Additionally, Aylon (2021)[3] found that young people are disproportionately stressed, anxious and lonely during the pandemic and were found to have general low levels of trust in the government, and subsequently least likely to comply with COVID-19 guidelines such as social distancing. This agrees with cluster 1 (Risk Takers) where there was low support for the government, and consequently low agreement with COVID restrictions and preventive measures.

In contrast, those with a strong trust in science were more likely to comply with COVID guidelines. Cluster 2 (Health Conscious) showed strong support for COVID restrictions and preventive measures and was twice the size of cluster 1. As our sample size was compromised of university students who are highly educated, it would be reasonable to assume they trust science. Thus, a majority would fall in the Health Conscious cluster, which agrees with findings in Aylon (2021).

In regards to reliability, Kline (1999)[4] suggested that in measuring internal consistency reliability, Cronbach's alpha should at least be greater than 0.7 for psychological constructs, and greater than 0.8 for cognitive tests. Our survey examined the psychological constructs that affect one's view on how the government handled COVID-19, and had a Cronbach alpha of 0.785. Therefore, on the whole, the survey had good internal consistency reliability.

6.4 Recommendations for Others

We recommend that others who do a similar project use a two stage cluster sampling technique where the primary sampling units are Sydney's geographic locations (e.g. Western Sydney, Easter Suburbs, North Shore) and the secondary sampling units are the UNSW students who live in the aforementioned regions. This ensures a better representation of UNSW students as there may be differences in the attitudes of UNSW students depending on their location (as the severity of lockdown has a varied impact depending on the geographic region). This is also superior to volunteer sampling as we can not tell if those who volunteered to complete our survey are different to those that did not (e.g. perhaps they hold stronger opinions then a typical UNSW student). However this rests on the assumption that a sampling frame of UNSW students and their area of living could be found.
Additionally, questions relating to political leaning, degree content and personality traits could be added in the survey. This could then be used in a regression analysis to see if a UNSW students attitude towards the NSW governments handling of COVID could be predicted from underlying factors.

[2]Newby, J., Faasse, K. 2021, "Public Perceptions of COVID-19 in Australia: Perceived Risk, Knowledge, Health-Protective Behaviours, and Vaccine Intentions", Front Psychol

[3]Ayalon, L. 2021, "Trust and Compliance with COVID-19 Preventive Behaviors during the Pandemic", International journal of environmental research and public health, vol. 18, no. 5

[4]Kline, P. (1999) A Handbook of Psychological Testing, 2nd edn. London: Routledg

7 Conclusion

In conclusion, we identified 5 reliable factors which influenced UNSW student's attitudes toward the NSW government's handling of COVID-19. These were:

- COVID strategy
- Preventive Measures
- Travel Restrictions
- Lifestyle
- Health Concerns

Two clusters were then identified, (1) the risk takers and (2) the health conscious with the majority of respondents falling into cluster 2. These results can be used to explore the attributes and satisfaction towards the NSW government and will help the government understand the public's perspective of their current COVID-19 strategy.

8 Appendix

8.1 Communalities

Communalities

	Initial	Extraction
How significant of a threat do you believe contracting COVID-19 would be to your health?	1.000	.776
How have Government-imposed COVID-19 restrictions impacted your daily life?	1.000	.620
To what extent has your work been impacted by COVID-19?	1.000	.697
In your view, are vaccinations effective at preventing the spread of COVID-19?	1.000	.787
In your view, how safe are COVID-19 vaccines?	1.000	.796
To what extent are lockdowns effective at preventing the spread of COVID-19?	1.000	.789
To what extent are social distancing measures effective at preventing the spread of COVID-19?	1.000	.700
To what extent are face masks effective at preventing the spread of COVID-19?	1.000	.729
To what extent is restricting the number of people at social gatherings effective at preventing the spread of COVID-19?	1.000	.416
To what extent has the NSW Government enforced the current COVID-19 restrictions?	1.000	.680
To what extent has the NSW population abided by the COVID-19 restrictions?	1.000	.775
To what extent has inter-state travel restrictions helped the NSW government in controlling COVID-19 cases in NSW?	1.000	.705

To what extent has International travel restrictions helped the NSW government in controlling COVID-19 cases in NSW?	1.000	.634
To what extent has the 14-day quarantine policy for Australians arriving home from overseas been at controlling the spread of COVID-19 in NSW?	1.000	.714
Temperature checks to detect whether an individual has COVID-19.	1.000	.692
Compulsory QR codes outside places of business.	1.000	.715
Making the spread of COVID-19 misinformation an offence.	1.000	.701
How would you rate the level of support given by the NSW Government to families and individuals?	1.000	.749
How would you rate the level of support given by the NSW Government to small businesses?	1.000	.768
To what extent are you satisfied with the NSW government's handling of COVID-19?	1.000	.665
How interested are you in NSW state and local politics?	1.000	.843

Extraction Method: Principal Component Analysis.

Figure 5: Communalities

8.2 Varimax Rotation Loadings

Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
How significant of a threat do you believe contracting COVID-19 would be to your health?	.164	.365	.266	.281	-.049	.651	-.198
How have Government-imposed COVID-19 restrictions impacted your daily life?	-.468	.059	-.151	.564	.206	-.094	-.069
To what extent has your work been impacted by COVID-19?	-.725	-.053	.109	-.196	.157	.009	.305
In your view, are vaccinations effective at preventing the spread of COVID-19?	.136	.556	.124	.634	-.149	-.109	.084
In your view, how safe are COVID-19 vaccines?	.094	.135	.523	.066	-.321	-.620	-.052
To what extent are lockdowns effective at preventing the spread of COVID-19?	.211	.281	.218	.760	.047	.176	.081
To what extent are social distancing measures effective at preventing the spread of COVID-19?	.122	.006	.390	.536	.341	.321	-.160
To what extent are face masks effective at preventing the spread of COVID-19?	-.155	.048	.122	.082	.821	.081	-.020
To what extent is restricting the number of people at social gatherings effective at preventing the spread of COVID-19?	.024	.216	.361	.312	.284	.241	-.046
To what extent has the NSW Government enforced the current COVID-19 restrictions?	.560	.340	.246	.060	-.249	.311	.168
To what extent has the NSW population abided by the COVID-19 restrictions?	.739	-.163	.192	.203	-.067	.012	.345
To what extent has inter-state travel restrictions helped the NSW government in controlling COVID-19 cases in NSW?	.104	.167	.665	.443	-.078	.035	.140

To what extent has International travel restrictions helped the NSW government in controlling COVID-19 cases in NSW?	.047	.201	.752	.038	.043	.001	-.152
To what extent has the 14-day quarantine policy for Australians arriving home from overseas been at controlling the spread of COVID-19 in NSW?	.163	.123	.789	.018	.215	.017	.057
Temperature checks to detect whether an individual has COVID-19.	.200	.703	.359	.052	.031	.158	.031
Compulsory QR codes outside places of business.	.032	.716	.366	.215	.104	-.106	-.007
Making the spread of COVID-19 misinformation an offence.	.132	.784	.014	.218	.055	.125	.057
How would you rate the level of support given by the NSW Government to families and individuals?	.660	.491	-.022	-.119	.147	-.136	-.135
How would you rate the level of support given by the NSW Government to small businesses?	.576	.214	.105	.053	.486	-.370	-.057
To what extent are you satisfied with the NSW government's handling of COVID-19?	.734	.252	.209	-.033	-.006	.126	.050
How interested are you in NSW state and local politics?	.008	.075	-.064	.020	-.042	-.058	.910

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 19 iterations.

Figure 6: Factor Loadings Using Varimax Rotation

8.3 Item-Total Statistic Table

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
How significant of a threat do you believe contracting COVID-19 would be to your health?	76.93	66.969	.479	.768
How have Government-imposed COVID-19 restrictions impacted your daily life?	77.21	74.248	-.004	.804
To what extent has your work been impacted by COVID-19?	77.83	81.370	-.284	.839
In your view, are vaccinations effective at preventing the spread of COVID-19?	76.57	67.396	.591	.765
In your view, how safe are COVID-19 vaccines?	76.74	73.023	.225	.783
To what extent are lockdowns effective at preventing the spread of COVID-19?	76.92	64.714	.635	.758
To what extent are social distancing measures effective at preventing the spread of COVID-19?	77.05	68.611	.487	.770
To what extent are face masks effective at preventing the spread of COVID-19?	76.87	73.582	.156	.786
To what extent is restricting the number of people at social gatherings effective at preventing the spread of COVID-19?	76.80	69.547	.441	.773
To what extent has the NSW Government enforced the current COVID-19 restrictions?	77.39	66.029	.461	.769
To what extent has the NSW population abided by the COVID-19 restrictions?	78.32	70.459	.311	.779

To what extent has inter-state travel restrictions helped the NSW government in controlling COVID-19 cases in NSW?	77.13	66.942	.622	.763
To what extent has International travel restrictions helped the NSW government in controlling COVID-19 cases in NSW?	76.79	69.075	.452	.772
To what extent has the 14-day quarantine policy for Australians arriving home from overseas been at controlling the spread of COVID-19 in NSW?	77.13	66.996	.541	.766
Temperature checks to detect whether an individual has COVID-19.	76.66	65.001	.658	.758
Compulsory QR codes outside places of business.	76.47	66.359	.636	.761
Making the spread of COVID-19 misinformation an offence.	76.67	65.530	.551	.763
How would you rate the level of support given by the NSW Government to families and individuals?	77.63	69.596	.345	.777
How would you rate the level of support given by the NSW Government to small businesses?	78.08	70.554	.335	.778
To what extent are you satisfied with the NSW government's handling of COVID-19?	78.07	67.129	.408	.773
How interested are you in NSW state and local politics?	78.32	74.246	.024	.797

Figure 7: Item-Total Statistic Table.

8.4 Dendrogram

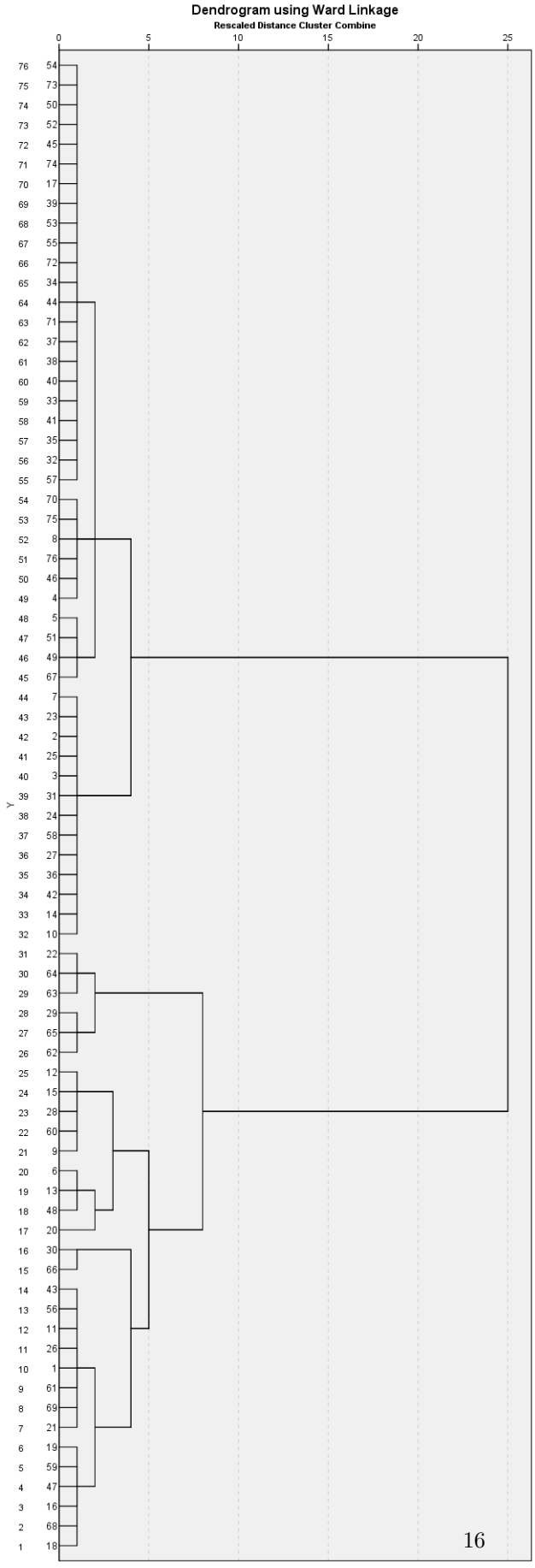

Figure 8: Dendrogram

8.5 Cluster Diagnosis

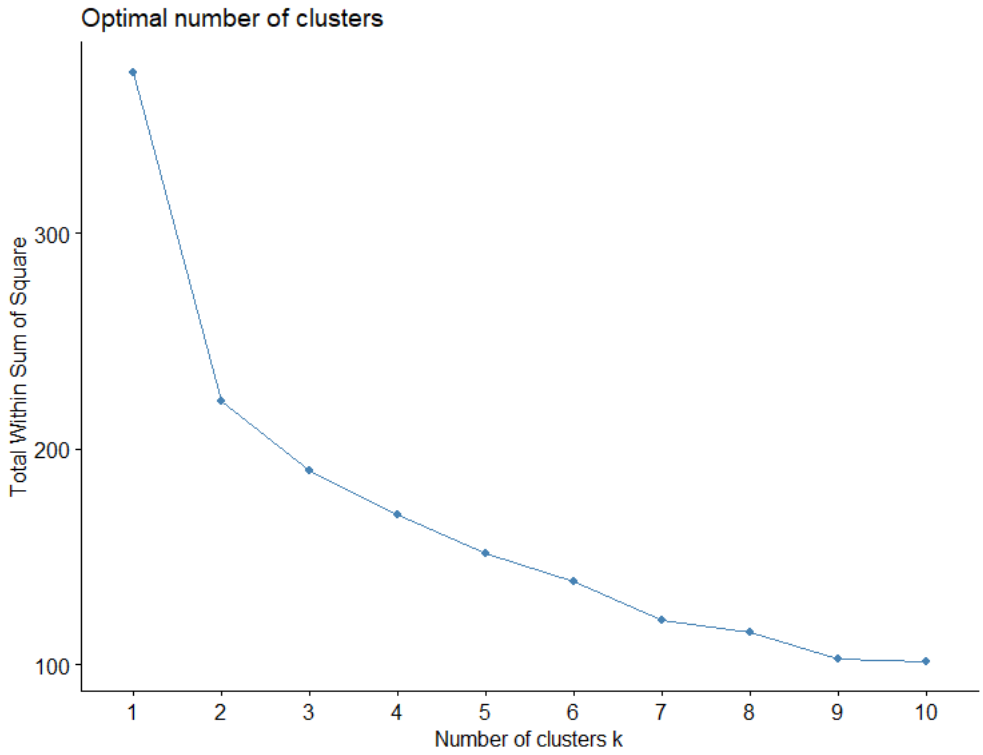

Figure 9: Elbow Method

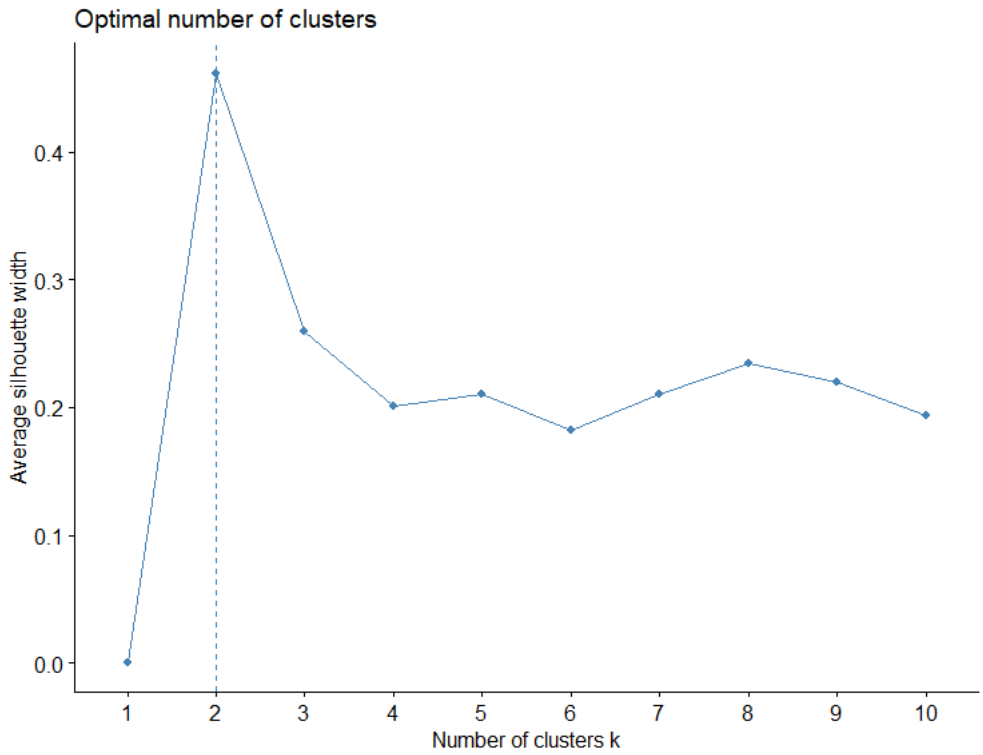

Figure 10: Silhouette Method

```
* Among all indices:
* 13 proposed 2 as the best number of clusters
* 3 proposed 3 as the best number of clusters
* 1 proposed 4 as the best number of clusters
* 3 proposed 5 as the best number of clusters
* 1 proposed 6 as the best number of clusters
* 1 proposed 13 as the best number of clusters
* 1 proposed 14 as the best number of clusters
* 1 proposed 15 as the best number of clusters

                    ***** Conclusion *****

* According to the majority rule, the best number of clusters is  2
```

Figure 11: R Cluster Diagnosis Output

8.6 K-Means Clustering

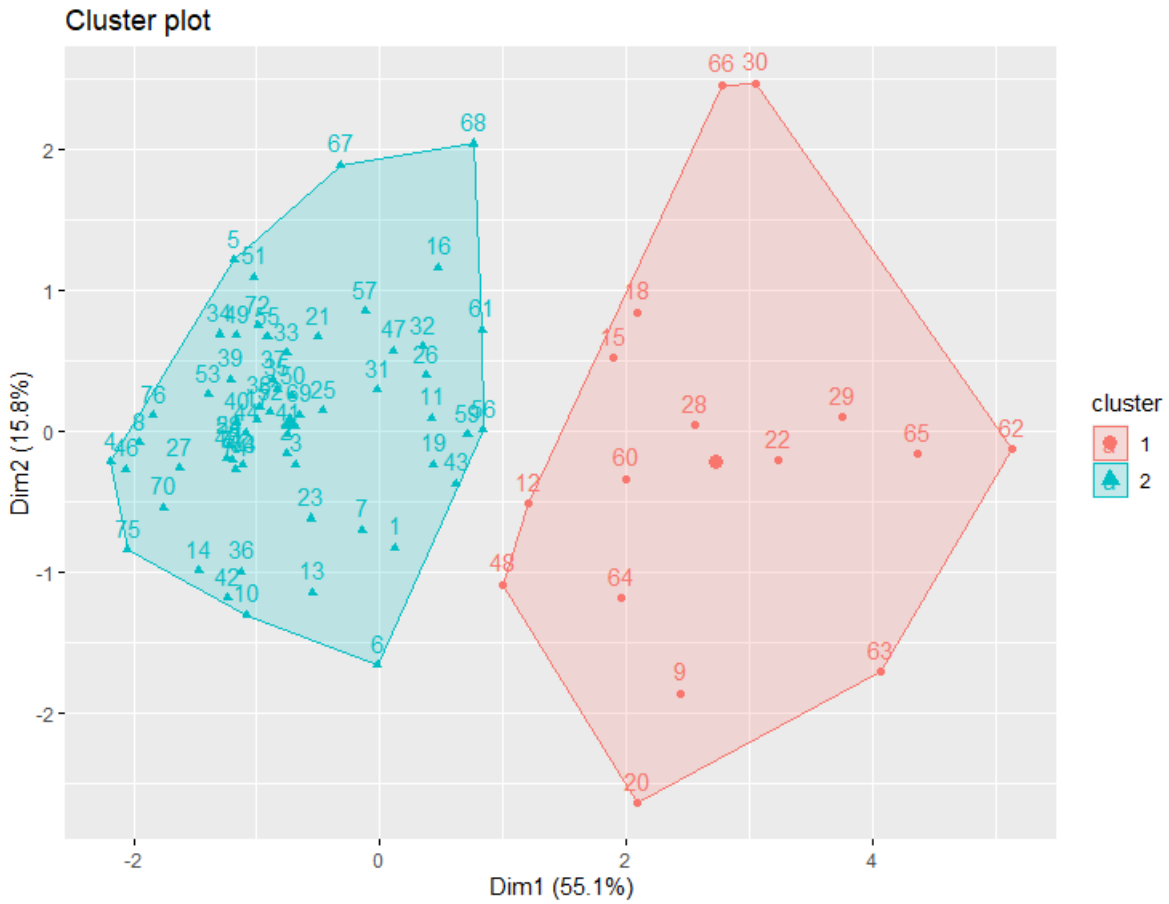

Figure 12: k-means clustering visualisation

8.7 R Code

R Set Up

```
#Dataset
Mean_covidresponseG
SMean_covidresponseG <- scale(Mean_covidresponseG)

#Packages
library(tidyverse)
library(cluster)
library(factoextra)
library(NbClust)
```

Cluster Diagnosis code used in R:

```
fviz_nbclust(Mean_covidresponseG, kmeans, method = "wss")
fviz_nbclust(Mean_covidresponseG, kmeans, method = "silhouette")
NbClust(data = Mean_covidresponseG, diss = NULL, distance = "euclidean", min.nc = 2, max.nc = 15,
method = "ward.D2", index = "all", alphaBeale = 0.1)
```

K-Means Clustering and visualisation code used in R:

```
standard_kmean <- kmeans(scale(Mean_covidresponseG),2)

fviz_cluster(standard_kmean, data = Mean_covidresponseG)
```