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Australia Council for the Arts

Methodology Report and Data

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1 Statistical Analysis

1.1 Overview

Following completion of the main 2019 NAPS survey, Lonergan undertook a series of statistical procedures to develop a suite of **statistical tools** that could be used by Council to better understand engagement with the arts across its national sample. Each tool was created from combining the data from a number of questions / variables.

The tools created were:

1. **A Behavioural Index** an engagement index based on frequency of attendance, reading, listening to, experiencing and creation across art forms
2. **An Attitudinal Index** reflecting a range of attitudes and beliefs about the value of the arts
3. **Driver analysis** indicating which factors drive engagement with the arts sector (based on the Behavioural Index)
4. **A Consumer Segmentation** reflecting how Australians cluster together on a range of attitudinal and behavioural measures

The creation of these tools was relatively complex. The methodology used has been outlined in this document to ensure the process is captured accurately and that the tools can be replicated over time and for subsequent NAPS data sets.

1.2 Behavioural Index

Step 1. Question selection

To establish the Behavioural Index, a set of questions was selected for inclusion. The index was intended to be a measure of active, passive, and creative engagement activities (e.g. attending different types of events, listening to music, reading and creating art across a range of forms). The selected questions were Q1, Q2, Q19, Q21, Q26 and Q35 (code O1 only). Whilst other questions also recorded engagement, these questions were not mutually exclusive to those selected and were therefore excluded from the index.

There are three components which formed the Behavioural Index

Component 1 - Active engagement: This includes engagement when people actively take the initiative to pursue art events that require attendance at a place away from home. The active behaviour component includes the scores of each sub-question of Q2.

Component 2 - Passive engagement: This includes people engaging with the arts in their own home (or similar), such as reading a book or listening to music. This component includes each sub-question of Q19 and Q21.

Component 3 - Creative engagement. This type of engagement involves the participant actively creating art. This component includes each sub-question of Q26, and Q35_1.

Table 1. Questions usage for each component

Behavioural Components	Weighting	Questions
Component 1- Active engagement (attendance)	33.33%	Q1 - none of these (coded into Q2 as Never) Q2 - frequency of attendance <ul style="list-style-type: none"> ➤ Once a week or more often ➤ Every 2-3 weeks ➤ Once a month ➤ Every couple of months ➤ Three or four times a year ➤ Once or twice in the last year ➤ Never
Component 2 - Passive engagement (listening to music, reading)	33.33%	Q19 (frequency of music) Q21 (frequency of reading) <ul style="list-style-type: none"> ➤ Daily ➤ Every 2 - 3 days ➤ Once a week or more often ➤ Every 2-3 weeks ➤ Once a month ➤ Every couple of months ➤ Three or four times a year ➤ Once or twice in the last year ➤ Never
Component 3 - Creative engagement (creating)	33.33%	Q26 Creation across key art forms <ul style="list-style-type: none"> ➤ Checked Q35 Digital (Code 1) <ul style="list-style-type: none"> ➤ Checked

The decision to give each component equal weight was made after consultation, but is arbitrary.

Step 2. Allocate a value to each code for each question

1) Allocate a score for each sub-question.

Each question within a component was given the same maximum score, as shown below. The total Behavioural Index score is 100, with a range from 0 to 100.

Table 2. Allocate a score for each sub-question

Question	Number of sub-questions / options	Score	Total Score
Q2	5	6.68	33.3
Q19	4	4.76	19.0
Q21	3	4.76	14.3
Q26	5	5.55	27.75
Q35_1	1	5.55	5.55
Total			100

2). Convert frequencies to times per year

On the basis of the respondent's answer / frequency, we have a calculation for average times per year for each category.

Table 3. Average times per year in Q2

Q2 Frequency	Avg. times per year
Never	0
Once or twice in the last year	1.5
Three or four times a year	3.5
Every couple of months	5.5
Once a month	12
Every 2-3 weeks	21.74
Once a week or more often	78.27

Table 4. Average times per year in Q19 & Q21

Q19 & Q21 Frequency	Avg. times per year
Never	0
Once or twice in the last year	1.5
Three or four times a year	3.5
Every couple of months	5.5
Once a month	12
Every 2-3 weeks	21.74
Once a week or more often	78.27
Every 2 - 3 days	152.19
Daily	365.25

3). Use a square root transformation on frequency counts

Due to the large numeric discrepancy between the lowest score and highest score, a square-root transformation was applied to reduce the mathematical impact of conducting one activity at a high frequency (e.g. selecting reading E-book 'daily', but no other activity would result in a higher passive component score than someone who participated in five different passive activities once a week). The impact of this is that the index favours **diversity** over **frequency of a single activity**. The modified scores by square root are presented below.

Table 5. Square root score of frequency Q2

Q2 Frequency	Avg. times per year – Score
Never	0.00
Once or twice in the last year	1.22
Three or four times a year	1.87
Every couple of months	2.35
Once a month	3.46
Every 2-3 weeks	4.66
Once a week or more often	8.85

Table 6. Square root of frequency for Q19 & Q21

Q19 & Q21 Frequency	Avg. times per year - Score
Never	0.00
Once or twice in the last year	1.22
Three or four times a year	1.87
Every couple of months	2.35
Once a month	3.46
Every 2-3 weeks	4.66
Once a week or more often	8.85
Every 2 - 3 days	12.34
Daily	19.11

4). Calibrate and rebase score

The scale then needed to be rebased and the scores made consistent with our allocation strategy at the beginning of Step 2 (table 2).

Table 7. Calculation of the score to the allocated weight in Q2

Q2 Frequency	Avg. times per year – Score
Never	0.00
Once or twice in the last year	0.92
Three or four times a year	1.41
Every couple of months	1.77
Once a month	2.62
Every 2-3 weeks	3.52
Once a week or more often	6.68

Table 8. Calculation of the score to the allocated weight in Q19 & Q21

Q19 & Q21 Frequency	Avg. times per year - Score
Never	0.00
Once or twice in the last year	0.30
Three or four times a year	0.47
Every couple of months	0.58
Once a month	0.86
Every 2-3 weeks	1.16
Once a week or more often	2.20
Every 2 - 3 days	3.07
Daily	4.76

Step 3. At a respondent level, sum the scores to create a raw component score

1. **Behavioural Component 1 - Active Engagement** = sum of the scores from Q2_1, Q2_2, Q2_3, Q2_4, and Q2_5. The Active Engagement Index ranges from 0 to 33.33.

- 2. **Behavioural Component 2 - Passive Engagement** = sum of the scores from Q19_1, Q19_2, Q19_3, Q19_4, Q21_1, Q21_2, and Q21_3. The Passive Engagement Index ranges from 0 to 33.33.
- 3. **Behavioural Component 3 - Creative engagement** = sum of the scores from Q26_1, Q26_2, Q26_3, Q26_4, Q26_5, and Q35_1. The Creative Engagement Index range is from 0 – 33.33
- 4. **Total Arts Behavioural Index** = sum of Active Engagement, Passive Engagement, and Creative Engagement. The total Arts Behavioural Index ranges from 0 – 100.

Step 4. Create a multiplier for total Behavioural Index

The average score for total behavioural and each component are presented in the table below:

Table 9. Average Behavioural Index scores

	Total Behavioural Index	Component 1 - Active Engagement Index	Component 2 - Passive Engagement Index	Component 3 - Creative Engagement Index
Average	16.18	2.63	9.16	4.39

The fact that the average is 16.18 is meaningless. To make the index easier to interpret, we altered this to make the mean 100.

Note the passive index average is higher than the other two components as these activities are conducted more often.

Calculate the multiplier by using the formula below:

Behavioural Multiplier = 100 / average Behavioural Index score

Table 10. Multiplier for total Behavioural Index

	Total Behavioural Index
Multiplier	6.18

Step 5. Calibrate to make the average index score to 100

Final behaviour scores for each respondent can be calculated using the formula below:

Final Behavioural Index Score = Raw Behavioural Index Score * Behaviour Multiplier

Although this next step is not mathematically necessary, we calibrated the data to make the 2020 (base year) have a value of 100 (rather than 16.18). We simply multiplied each score by (100/16.18). The range of the Behavioural Index after modification is 0 – 617.98.

Step 6. Behavioural Index Quintiles

Respondents were divided into five equal groups (quintiles) based on their Behavioural Index score.

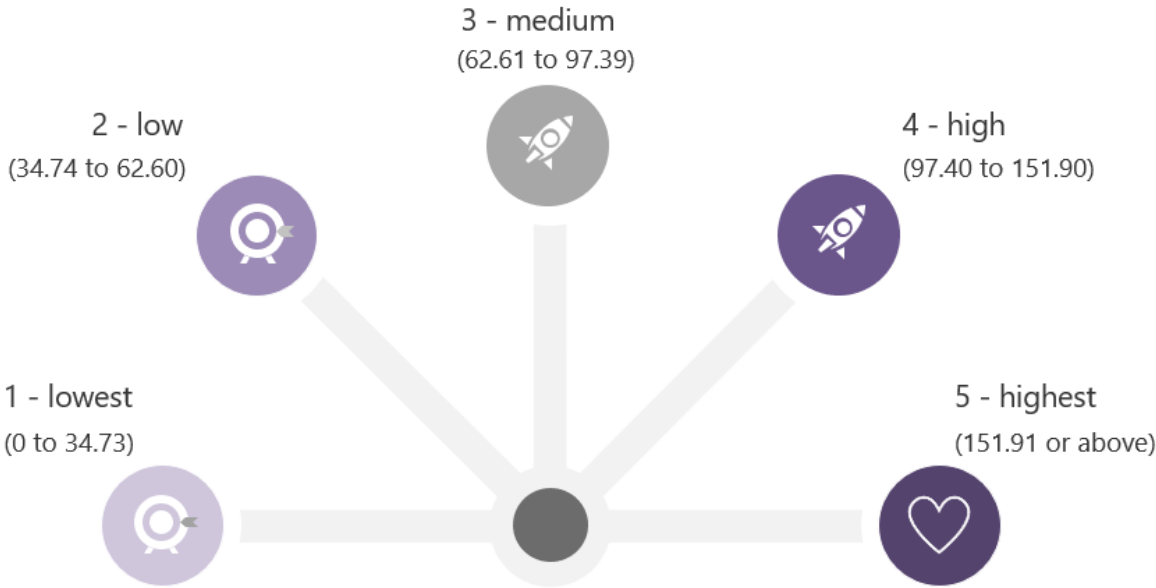
Table 11. Behavioural Index Quintiles

Category	Number of Cases in each Cluster	Score
1 st	1803	0 – 34.73
2 nd	1771	34.74 – 62.60
3 rd	1787	62.61 – 97.39
4 th	1781	97.40 – 151.90
5 th	1786	>151.91

Step 7. Visualise

The quintiles were named, and icons were created

Figure 1. Behavioural Index Quintiles



1.3 Attitudinal Index – Statistical Formula

Step 1. Question selection

Questions which recorded core attitudes to the arts were chosen for inclusion (Q41 and Q42. As Q41 was asked using a split run (using different language for expressing ‘the arts’, See NAPS 2019 Report), a merged variable was used.

Table 12. Attitudinal questions

Attitude concepts	Weighting	Questions
Attitudes to the Arts (Agree/Disagree)	50%	Q41A Q41B Split run
Impact statements about the Arts (Impact scale)	50%	Q42
Q41A and Q41B merged into a new Q41 merged question		

Step 2. Allocate a value to each code for each question

1) Allocate a score for each sub-question

The maximum attitudinal index score is 100, with a range from -50 to 100.

Table 13. Allocate a score for each sub-question

Question	Number of sub-questions / options	Score range	Total Score
Q41 merge	10	-5 to 5	-50 to 50
Q42	10	0 to 5	0 to 50

2). Allocate a score for each code in Q41 and Q42

On the basis of the respondent’s answer, we allocated a score for each response code.

Table 14. Allocate a score for each response code in Q41 (except Q41_5)

Q41 (except Q41_5)	Scores
Strongly Agree	5
Agree	2.5
Neither agree nor disagree	0
Disagree	-2.5
Strongly Disagree	-5

Table 15. Allocate a score for each response code in Q41_5

Q41_5	Scores
Strongly Agree	-5
Agree	-2.5
Neither agree nor disagree	0
Disagree	2.5
Strongly Disagree	5

Please note Q41_5 was a negative statement.

Table 16. Allocate a score for each response code in Q42

Q42	Scores
A very big impact	5
A big impact	3.75
Some impact	2.5
Not much impact	1.25
No impact at all	0

Step 3. Generate an Attitudinal Index score for each respondent

At a respondent level, the Attitudinal Index = sum of the scores (Q41_merge and Q42). The index ranges from -50 to 100.

Please note: The attitudinal index scoring system gives a 10 units range (-5 to +5) for Q41A/B and a 5 units range for Q42 (0 to 5). Statistically, this gives double the weight to each statement in Q41A/B relative to Q42. This is known and deliberate, as we believe each element in Q41A/B is roughly twice as important as in Q42.

At a logical level, there is a lot more diversity in what is measured in Q41 and Q42. Q42 is strictly limited to the **impact** of the arts (across 10 areas), whereas Q41 has no such constraints. This is supported by our earlier PCA analysis outcomes – Q41 finds 2 components and Q42 only has one. Both the two components in Q41 contribute to the final attitudinal index, which implies it is appropriate to have double the weight for Q41. We examined the correlation between variables within each question set. Within Q41, we found an average absolute correlation of 0.43, compared with 0.63 for Q42. This implies there is a greater diversity of components in Q41 than Q42, hence it is appropriate to give Q41 a higher weight in the index.

Note that $0.62^2 \div 0.43^2 = 2.09$ therefore Q41 having twice the weight on the index than Q42 is appropriate.

In addition, Lonergan also made another attitudinal index, which has 10 units range (-5 to 5) in Q41 and 10 units range (0 - 10) in Q42. The result presents the two indexes are highly correlated, with the correlation coefficient being 0.992, which also indicates the high accuracy of the attitudinal index.

Step 4. Create a multiplier for total attitudinal index

The average score for total attitudinal index is presented in the table below:

Table 17. Average Attitudinal Index

	Total Attitudinal Index
Average	51.47

To make a benchmark of average attitudinal index, we shift all the attitudinal index score to 0 or positive numbers by plus 50, then the average attitudinal index is 101.47. A multiplier was calculated by this formula:

$$\text{Attitudinal Multiplier} = 100 / \text{Shift Average Attitudinal Index}$$

Table 18. Multiplier of attitudinal index

	Total Attitudinal Index
Multiplier	0.985

Step 5. Calibrate the average attitudinal index score to 100

The final attitudinal index score for each respondent can be calculated by the formula below:

$$\text{Final Attitudinal Index} = (\text{Raw Attitudinal Index} + 50) * \text{Attitudinal Multiplier}$$

The range of the attitudinal index after modification is 0 – 147.82.

Step 6. Attitudinal Index Quintiles

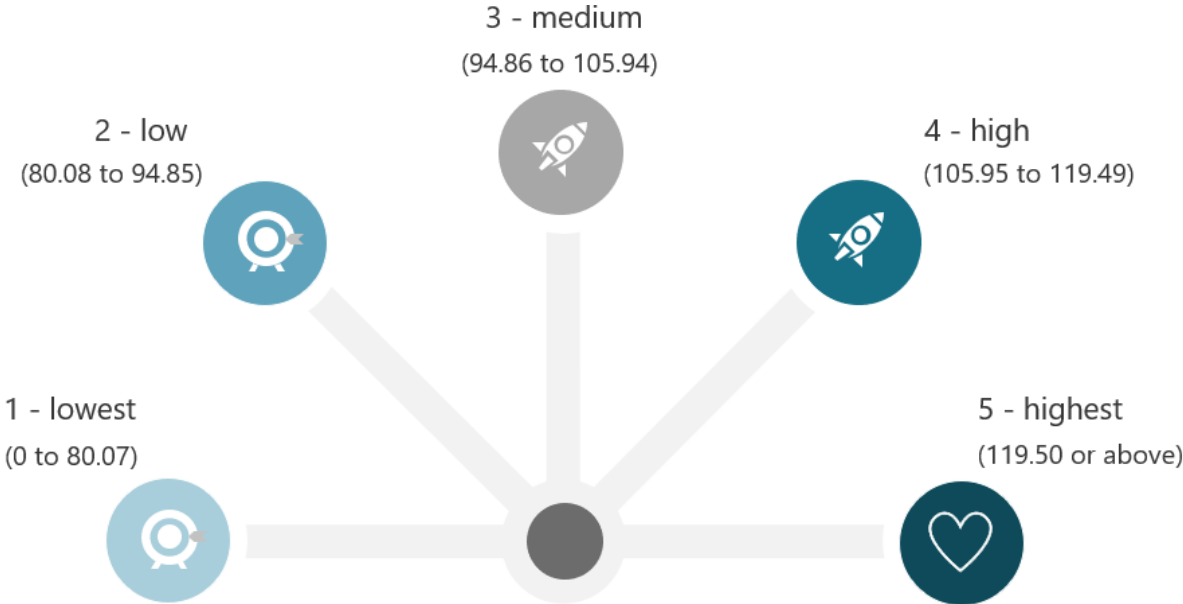
Table 19. Attitudinal Index Quintiles

Category	Number of Cases in each Quintile	Score
1 st	1792	≤ 80.07
2 nd	1815	80.08 – 94.85
3 rd	1880	94.86 – 105.94
4 th	1667	105.95 – 119.49
5 th	1774	≥ 119.50

Step 7. Visualise

The quintiles were named, and icons created

Figure 2. Attitudinal Index Quintiles



Comparing of the two indexes

Although both indexes have a mean score of 100 in 2019, they will move in quite different ways. The Behavioural Index is highly skewed, whereas the Attitudinal Index has a normal distribution.

Figure 3. Skewed distribution of Behavioural Index

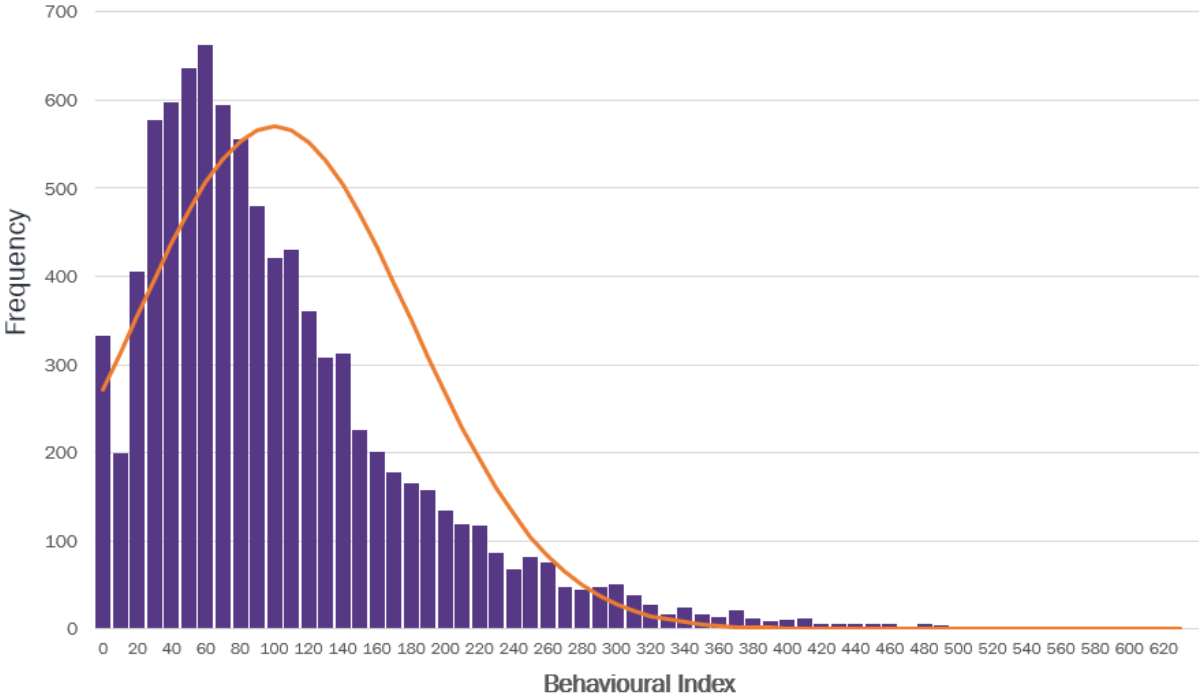
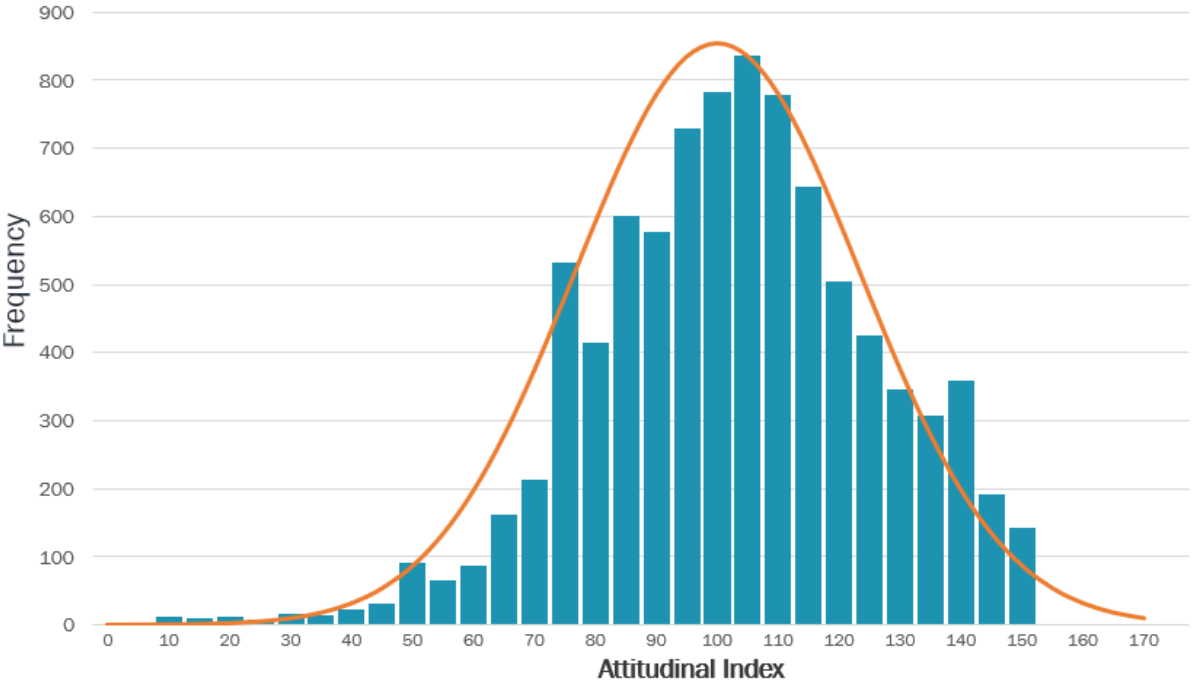


Figure 4. Normal distribution of Attitudinal Index



Furthermore, the spread on the attitudinal index is far greater, implying we will see far more variation in the behavioural than the attitudinal index. In other words, a movement of 5 points in the Behavioural Index is not the same as a movement of 5 points in the attitudinal index.

Table 20. Comparison of the Behavioural Index and the Attitudinal Index

	Behavioural Index	Attitudinal Index
Mean	100	100
Median	77.80	101.01
Standard deviation	82.89	23.44
First quintile	0 – 34.73	0 – 80.07
Second quartile	34.74 – 62.60	80.08 – 94.85
Third quartile	62.61 – 97.39	94.86 – 105.94
Fourth quartile	97.40 – 151.90	105.95 – 119.49
Fifth quintile	≥ 151.91	≥ 119.50

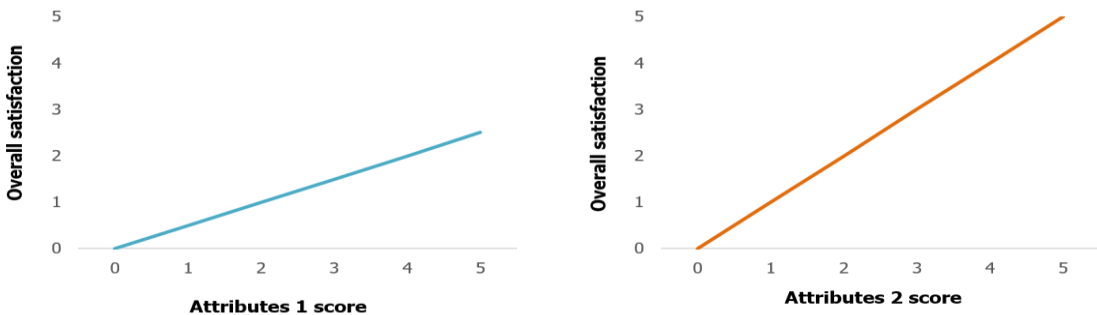
1.4 Drivers of engagement

Identifying drivers of overall satisfaction involved two processes:

1. Correlation analysis – measuring the strength of the relationship
 - Correlation is a measure of how changes in one variable (in this case the Behavioural Index) are reflected in a second variable. This is on a scale of -1 (perfect negative) to 1 (perfect positive relationship). It does not measure the size of the relationship nor is correlation a causation.
2. Regression analysis – measuring the size of the relationship
 - Each variable is then regressed individually (linear regression). The net result is a regression coefficient shown by the slope of the line of best fit (i.e. the value of ‘m’ in the equation ‘y=mx+b’). This reflects the size of the relationship between arts behaviour and each independent variable.

In the diagram, both independent variables have a strong correlation with dependent variables, yet independent Variable 2 has twice as much impact on dependent variable as independent Variable 1.

Figure 5. Correlation and Regression



We therefore use correlation across all variables, and only where appropriate, supplement this with regression. Note that the regression scores are not always comparable across variables (e.g. Q41 is scored from -5 to 5 i.e. a 10 points range, whereas Q42 is scored from 0 to 5 – a 5 points range, therefore coefficients for Q41 will be twice as big as Q42).

Step 1. Identify variables of interest

Dependent variable: Total Behavioural Index

Independent variables are listed in table below:

Table 21. Independent variables

Attitudes	Demographics	Behaviour	Motivations	Barriers
Q41	Age(D2)	Q40	Q16	Q17
Q42	Work status (Z1)	Funding and giving back to the arts	Reasons people attend creative, cultural, and artistic events/festivals	Reasons people may not attend creative, cultural, and artistic events/festivals, or may not go as often as they would like to
Attitudes to arts	Income (Z2) Education (Z3) Parents status (Z4b)			

Note: all the independent variables are coded to enable the data can be used for correlation and regression analysis.

Step 2. Outcomes – Attitudes

Each sub-question in Q41 is scored from strongly disagree -5 to strongly agree 5, and each sub – question in Q42 is scored from no impact at all 0 to a very big impact 5.

Table 22 presents the outcomes of descending by correlation.

Table 22. The correlation of attitudes with Behaviour Index

Attitude statements	Cor.
Q41_2 The arts allow me to connect with others	0.38
Q42_10 Building creative skills that will be necessary for the future workforce	0.32
Q42_3 Our ability to think creatively and develop new ideas	0.31
Q42_7 Helping us deal with stress, anxiety or depression	0.31
Q42_8 Our sense of wellbeing and happiness	0.31
Q42_2 Bringing customers to local businesses	0.30
Q41_9 The arts help you to understand perspectives different to your own	0.30
Q42_1 Shaping and expressing Australian identity	0.29
Q42_9 Stimulating our minds	0.29
Q41_3 There are plenty of opportunities for me to get involved in the arts	0.29
Q41_4 The arts make for a richer and more meaningful life	0.29
Q42_4 Our ability to express ourselves	0.29
Q42_5 Our understanding of other people and cultures	0.29
Q41_8 Artists make an important contribution to Australian society	0.28
Q41_6 The arts should receive public funding	0.28
Q41_1 The arts should be an important part of education	0.27
Q42_6 Child development	0.27
Q41_10 Artists should have freedom of expression	0.23
Q41_7 The arts in Australia reflect the diversity of cultures present in Australia	0.19
Q41_5 The arts are not really for people like me	0.06

Note: Q41 uses the merged data from both question wordings.

Agreement with the statement the ‘arts allow me to connect with others’ has the strongest relationship with the Behavioural Index, followed by ‘building creative skills that will be necessary for the future workforce’ and ‘Our ability to think creatively and develop new ideas’. The top 7 attitudes (down to ‘the arts help you to understand perspectives different to your own’) have a correlation of over 0.3, which indicates a medium level of impact on Behavioural Index. Other attitudes in Q41 and Q42 have a weak relationship with the Behavioural Index, and the attitudes towards ‘the arts are not really for people like me’ does not have any discernible relationship with the Behaviour Index.

To find more variables with a medium or better relationship with the Behaviour Index, we applied principal component analysis to reduce and group relevant attitudes together. The new groups / components have been tested to explore stronger relationship.

Reduce attitudinal statements – Principal Component Analysis (PCA)

Table 23. PCA analysis of attitudes

Statement	Component 1	Component 2	Component 3
Q42_8. Our sense of wellbeing and happiness	0.78		
Q42_7. Helping us deal with stress, anxiety, or depression	0.78		
Q42_3. Our ability to think creatively and develop new ideas	0.77		
Q42_9. Stimulating our minds	0.76		
Q42_6. Child development	0.75		
Q42_4. Our ability to express ourselves	0.75		
Q42_10. Building creative skills that will be necessary for the future workforce	0.74		
Q42_5. Our understanding of other people and cultures	0.73		
Q42_1. Shaping and expressing Australian identity	0.73		
Q42_2. Bringing customers to local businesses	0.72		
Q41Merge_8. Artists make an important contribution to Australian society		0.74	
Q41Merge_4. The arts make for a richer and more meaningful life		0.73	
Q41Merge_9. The arts help you to understand perspectives that are different to your own		0.73	
Q41Merge_1. The arts should be an important part of education		0.71	
Q41Merge_6. The arts should receive public funding		0.70	
Q41Merge_2. The arts allow me to connect with others		0.66	
Q41Merge_7. The arts in Australia reflect the diversity of cultures present in Australia		0.62	
Q41Merge_10. Artists should have freedom of expression		0.61	
Q41Merge_5. The arts are not really for people like me			0.71
Q41Merge_3. There are plenty of opportunities for me to get involved in the arts			-0.64

PCA analysis indicates there are only 2 components in Q41 and only 1 component in Q42 - the variations are not spread very well. Instead, we generated 6 components in Q41 and Q42 manually, grouped the variables by relevant statements which made logical sense.

Table 24. Attitudes components

New attitudes Components
Component 1 – Arts are for me
Q41_3. There are plenty of opportunities for me to get involved in the arts
Q41_5. The arts are not really for people like me
Component 2 – Wellbeing
Q42_7. Helping us deal with stress, anxiety or depression
Q42_8. Our sense of wellbeing and happiness
Component 3 – Creative thinking and expression
Q42_4. Our ability to express ourselves
Q42_3. Our ability to think creatively and develop new ideas
Q41_10. Artists should have freedom of expression
Q42_9. Stimulating our minds
Component 4 – Education and skills
Q42_6. Child development
Q41_1. The arts should be an important part of education
Q42_10. Building creative skills that will be necessary for the future workforce
Component 5 – Value to society and funding
Q41_8. Artists make an important contribution to Australian society
Q41_6. The arts should receive public funding
Q42_2. Bringing customers to local businesses
Q42_1. Shaping and expressing Australian identity
Component 6 – Diversity and Meaning
Q41_9. The arts help you to understand perspectives that are different to your own
Q41_2. The arts allow me to connect with others
Q42_5. Our understanding of other people and cultures
Q41_4. The arts make for a richer and more meaningful life
Q41_7. The arts in Australia reflect the diversity of cultures present in Australia

Five of the six new components with Behavioural Index had a correlation above 0.3, as shown in the table below:

Table 25. Correlation of attitude components with Behaviour Index

Attitude components	Cor.
New_attitude_component_1. Arts are for me	0.37
New_attitude_component_2. Wellbeing	0.35
New_attitude_component_3. Creative thinking and expression	0.34
New_attitude_component_4. Education and skills	0.34
New_attitude_component_5. Value to society and funding	0.33
New_attitude_component_6. Diversity and Meaning	0.23

The last component - Diversity and meaning also had some impact on Behavioural Index, but the impact is relative lower than the previous five components. Attitudinal components correlations are better than single attitudinal factors.

Step 3. Outcomes – Demographics

Except for age, demographics do not correlate strongly with the Behavioural Index score. The correlation with age reflects an inverse medium level relationship. Therefore, as age increases the score on the Behavioural Index decreases.

Table 26. Code of age

Age	
Code 1	15 - 34 years old
Code 2	35 - 54 years old
Code 3	55 years old or above

Table 27. Code of education

Education	
Code 1	Lower education - below university
Code 2	Higher education - university and above

Table 28. Code of work status

Work status	
Code 1	Not working
Code 2	Workers

Table 29. Code of parent status

Parent with kids / under 16	
Code 1	No
Code 2	Yes

Table 30. Correlation of demographics with Behavioural Index

Demographics	Cor.
D2. Age	-0.33
Z3. Education background	0.18
Z1. Work status	0.17
Z4b. Parent with kids / under 16	0.16
Z2. Income	0.16

Step 4. Outcomes – Motivations & Barriers

Table 31. Code of motivations & barriers

Q16 & Q17	
Code 1	Unchecked
Code 2	Checked

Two motivations to attend arts events have medium level of impact on the Behavioural Index. These are – ‘to develop skills for education, training or work’ and ‘to express myself’. When these are scored more highly, the Behavioural Index goes up. Two motivations – ‘improve my wellbeing’ and ‘to understand other perspectives and cultures’ indicate low level impact on Behavioural Index. In terms of barriers, there were no strong correlations found.

Table 32. Correlation and regression of motivations with Behavioural Index

Motivations to attend	Reg.	Cor.
Q16_5. To develop skills for education, training or work	12.35	0.33
Q16_4. To express myself	11.92	0.33
Q16_3. improve my wellbeing	6.65	0.23
Q16_1. To understand other perspectives and cultures	5.40	0.20
Q16_2. To socialise and connect with others	4.44	0.16
Q16_6. To have fun/to be entertained	-0.14	-0.04

Table 33. Correlation of barriers with Behaviour Index

Barriers	Cor.
Q17_3. Lack of personal interest	-0.14
Q17_5. Health (physical or mental)	0.05
Q17_4. Friends/family not interested	0.08
Q17_9. Safety concerns	0.08
Q17_2. Cost of tickets/entry	0.09
Q17_8. Too far away/not near where I live	0.10
Q17_6. Difficulty getting there (e.g. poor public transport)	0.11
Q17_10. Event information isn't provided in my language	0.15
Q17_1. Hard to find the time	0.18
Q17_7. Lack of awareness/information	0.20
Q17_3. Lack of personal interest	-0.14

Reduce motivations and barriers – Principal Component Analysis (PCA)

To seek stronger relationship between motivation/barriers and Behavioural Index, PCA analysis was applied to group relevant factors. Two motivational components and four barrier components were generated by PCA, and the outcomes were very similar with single motivation and barrier factors. Only one of the motivation components finds a medium level relationship with Behavioural Index, and none of the barrier components had a medium or strong relationship with the Behavioural Index.

Table 34. PCA outcomes of motivation

Statement	Component 1	Component 2
Q16_5. To develop skills for education, training or work	0.66	
Q16_4. To express myself	0.65	
Q16_3. To improve my wellbeing	0.59	
Q16_1. To understand other perspectives and cultures	0.48	
Q16_6. To have fun/to be entertained		0.77
Q16_2. To socialise and connect with others		0.47

Table 35. Correlation and regression of motivation components with Behavioural Index

Motivation Components	Reg.	Cor.
Motivation Component 1 – Higher needs / achieve life goals	10.44	0.39
Motivation Component 2 – For fun and to socialise	6.79	0.23

Table 36. PCA outcomes of barriers

Statement	Component 1	Component 2	Component 3	Component 4
Q17_8. Too far away/not near where I live	0.69			
Q17_6. Difficulty getting there	0.68			
Q17_2. Cost of tickets/entry	0.63			
Q17_1. Hard to find the time		0.72		
Q17_7. Lack of awareness/information (e.g. when/where)		0.55		
Q17_5. Health (physical or mental)			0.62	
Q17_10. Event information isn't provided in my language			0.62	
Q17_9. Safety concerns			0.59	
Q17_3. Lack of personal interest				0.80
Q17_4. Friends/family not interested				0.45

Table 37. Correlation of barriers components with Behavioural Index

Barrier Components	Cor.
Barriers Component 2 – Lack of time / awareness	0.02
Barriers Component 3 – Lack of ability	0.00
Barriers Component 1 – Not easy to access / budget limit	-0.08
Barriers Component 4 – No interest	-0.13

1.5 Consumer Segmentation

Segmentation is a classification method which uses a cluster analysis to arrange sets of individuals into groups. The aim is to establish a set of segments such that individuals within a given group are more similar to each other than they are to individuals in other groups (or to maximise homogeneity within a group). The degree of association is strong between members of the same group and weak between members of different groups. A multivariate consumer segmentation was used to allow for a range of different types of variables to be used and fed into the segmentation model.

Step 1: Select variables

The segmentation analysis aimed to segment the NAPS 2019 data set of Australians, based on the following questions and custom variables:

1. Gender (D3)
2. Age (D2)
3. Education background (Z3)
4. Culturally and linguistically diverse background / First Nations heritage (Z6 & Z7)
5. Willingness to attend more arts events/activities (Q15)
6. Motivations / reason to attend arts events (Q16)
7. Reasons to not attend arts (Q17)

Custom variables:

8. Behavioural Index (how often people engage with the arts) or Active engagement, Passive engagement, and Creative engagement
9. Attitudinal Index

Attitudinal Index (strength of values/support of the arts) or 6 attitude components

10. PCA Motivations 2 components (replace Q16)
11. PCA Barriers 4 components (replace Q17)

Step 2: Trial model examples

All the variables were used in the various iterations and segmentation models that were created. However, some variables proved to be unproductive (worked against the model) and were removed from the final modelling to make the optimal solution. A two – step cluster analysis was applied.

Ten models were trailed, and the most favourable and explainable model selected to be used (see below).

Step 3: Cull / reduce variables

Regardless of modelling, it was difficult find solutions that differentiated the demographic variables, and these variables emerged as of very low importance in the final modelling. As a result, the following were dropped from the final model:

Removed:

- Gender (D3)
- Age (D2)
- Education background (Z3)
- Culturally and linguistically diverse background / First Nations heritage (Z6 & Z7)

Age did have some relevance – however it was not a discrete enough measure to be useful (e.g. age range used might need to be grouped into younger 15-44 and older 45+).

Step 4: Maximise model score and relevance of segmentation

This segmentation analysis is an iterative process which altogether resulted to having 10 variations to find the best model to use as the 2019 segments.

Model 1

The first model used all 9 questions presented above. For this particular model, the individual variables for barriers and motivations were applied. While the modelling quality was good, there were 10 segments presented, ranging from 3.2% (n=280) of the population to 21.8% (n=1936). As the number of people in each segment varied quite significantly as well as having 10 segments is not ideal.

Model 2

Model 2 used all questions, including the components for barriers and motivations as opposed to its individual variables. The Two step cluster analysis showed there were 5 clusters, ranging from 4% (n=357) of the population to 41% (n=3619). Not only are the sizes of the cluster not ideal, it was found that CALD, education and gender presented very low importance in the segments. From the findings in the overall report, we know this is not the case.

Model 3

From the previous models (Model 1 and 2), it was found that only 11 factors can contribute to the segmentation model.

The factors used for Model 3 are the following:

1. Art engagement behaviour (Behaviour Index)
2. Art attitudes (Attitudinal Index)
3. Willingness to attend more arts activities (Q15)
4. Reasons to attend arts (Q16 – the 2 components found in PCA)
5. Reasons to not attend arts (Q17 – 4 components found in PCA)

After the Two Step cluster analysis was applied, 5 segments were found, ranging from 4.1% (n=367) of the population to 41.5% (n=3709) of the population, which is not ideal.

Model 4

Model 4 was used to test all factors to see which variables should be included in the model. The output was presented a poor to fair model score, with 3 segments found. Willingness to attend more activities (Q15), motivations (Q16) and barriers (Q17) contributed heavily to the model which is not the intended output. The aim is to have the behaviours and attitudinal components to drive the model.

Since the aim is to have the behaviours and attitudes to drive the model, willingness to attend more activities (Q15), motivations (Q16) and barriers (Q17) were removed. From this, 4 clusters were found but the cluster quality score was poor.

The next iteration was for art engagement behaviour and attitude factors to be kept while every other variable was removed. After the Two Step cluster analysis, 4 segments were found with a poor to fair model score.

From this model, it was found that willingness to attend more activities (Q15), motivations (Q16) and barriers (Q17) were key factors to segment people as well as the Behaviour Index. This model lacked attitudinal components driving the different clusters.

Model 5

Model 5 used all the questions, except for the demographics (i.e. gender, age, education and CALD). The Two step cluster analysis revealed there were 5 segments with a similar outcome to Model 3. The only difference from Model 3, is this model used the 6 components of the attitudes as opposed to the Attitudinal Index. This model had segments ranging from 4.1% (n=367) of the population to 40.7% (n=3635) of the population

Model 6

Model 6 used the 6 attitudinal components as well as willingness to attend more activities (Q15), motivations (Q16) and barriers (Q17). The Two Step cluster analysis revealed 2 segments. There were no particular drivers in this model and the cluster score was poor.

Model 7

Model 7 used the 6 attitudinal components, willingness to attend more activities (Q15), motivations (Q16), barriers (Q17), as well as the 3 components of the Behavioural Index (i.e. active, passive, and creative engagement).

This model gave a similar output to Model 3 and 5, but model 7 is driven more by attitude components. 5 segments were found using this model with a decent range from 12.7% (n=1130) of the population to 28.1% (n=2508).

Model 8

Model 8 used the 6 attitudinal components, willingness to attend more activities (Q15), motivations (Q16), barriers (Q17) as well as the creative engagement index. The Two step cluster analysis revealed the quite similar output as Model 5.

Model 9

Model 9 used the arts engagement Behavioural Index Components (active, passive, and creative engagement) as well as some of the demographics (age and parents). The Two step cluster analysis revealed 5 different segments, but the model didn't cluster by age very well. Three out of the five segments had ages of different ranges.

Model 10

Model 10 used the age variable as well as the arts engagement Behavioural Index Components (active, passive, and creative engagement). This model was done to focus on age and get a better model score. The Two step cluster analysis revealed 5 segments but one of the segments had all the age ranges. It was found the Behavioural Index score didn't make a difference across the segments, which means that if age contributes largely in the model, the indexes are invaluable.

In the end, Model 7 was the optimal solution to use as NAPS segments. The reason for this is not only because the sample sizes are good allocated to each segment, but also the model was driven by attitudinal statements and not demographics. The basis of these segments was to find any attitudinal or behavioural components driving the clusters. It also indicated more details of attitude and behaviours than other models. Also, the other models depended a lot on the demographics, and not necessarily on the important variables.

The summary of Model 7 is present below:

Table 38. Model 7 summary

	Seg 1 (20%, n=1765)	Seg 2 (16%, n=1396)	Seg 3 (12%, n=1130)	Seg 4 (28%, n=2508)	Seg 5 (25%, n=2129)
Behavioural Component 1 - Active engagement index	2.84	12.40	8.36	16.59	33.16
Attitude Component 5 - Value to society and funding	6.29	9.09	9.50	12.23	11.91
Attitude Component 6 - Diversity and Meaning	5.40	9.93	10.59	14.34	13.85
Q15	I am not interested in attending these kind of events / festivals (88%)	I am happy with how often I attend these kind of events / festivals (99%)	Ideally, I would like to attend more of these kind of events / festivals	Ideally, I would like to attend more of these kind of events / festivals	am happy with how often I attend these kind of events / festivals (97%)
No motivation to engage	Yes	No	No	No	No
Motivation Component 1 - higher needs / for achieve life goals	No	No	No (99%)	Yes	Yes
Motivation Component 2 - for fun and socialise	No	Yes	Yes	Yes (85%)	Yes (76%)
No barriers to engage	No (79%)	Yes	No	No	Yes
Barrier Component 1 - not easy to access / budget limit	No (52%)	No	Yes (83%)	Yes (85%)	No
Barrier Component 2 - Lack of time / awareness	No (77%)	No	No (51%)	Yes (60%)	No
Barrier Component 4 - No interest	Yes (58%)	No	No (69%)	No (63%)	No
Attitude Component 3 - Creative thinking and expression	9.89	12.10	12.92	14.72	13.94
Attitude Component 2 - Wellbeing	5.15	6.22	6.49	7.50	7.20
Attitude Component 4 - Education and skills	6.60	8.27	8.81	10.40	9.95
Behavioural Component 2 - Passive engagement index	33.84	51.34	52.16	63.99	72.19
Behavioural Component 3 - Creative engagement index	8.04	16.37	17.55	33.77	46.79
Attitude component 1 - Arts are for me	-0.81	1.40	1.23	2.56	2.13
Barrier Component 3 - Lack of ability	No (80%)	No	No (83%)	No (73%)	No

Please note: the last two factors - attitude component 1 and barrier component 3 contribute little to the model.