# Against All Odds: Inside Statistics – Two-Way Tables

**ABC ME screening details: Monday** 25th May, 2020 at 2:50pm

This episode can also be viewed on [ABC iView](https://iview.abc.net.au/show/against-all-odds-inside-statistics).

**Key learning areas:** Mathematics

**Level:** secondary

**About: One city surveyed the happiness of its residents. Two-way tables help organise the data and tease out relationships between happiness levels and opinions about aspects of the city itself.**

## Before the episode

1. Define the following terms: categorical variables, correlation, causation and census.
2. This episode is focused around data collected by the Somerville council in Massachusetts in their annual ‘Happiness Survey’. A sample of the questions from the survey are listed below. On a rating of 1 to 10 (1 being very unhappy or unsatisfied and 10 being very happy or very satisfied) how would you rate yourself and your neighbourhood on the following questions?
   1. How happy are you right now?
   2. How satisfied are you with your suburb as a place to live?
   3. How proud are you to be a resident of your neighbourhood?
   4. How satisfied are you with the beauty or physical setting of your neighbourhood?
3. If you ran the above survey with your class, what do you think would be the best way to display the data?

## During the episode

1. Somerville has a diverse population. List the 3 categories of people that are mentioned at the beginning of the episode.
2. In a fraction, what is the difference between a numerator and a denominator? In the two-way table, what is the denominator of each fraction showing?
3. Looking at the two-way table shown during the episode, how many people completed the survey in total and of those people how many of them indicated that they were happy?

## After the episode

1. Data analyst, Daniel Hadley spoke about the ‘average’ happiness score being a 7.5. ‘Average’ is a common term used to describe the ‘mean’ of a data set. How do you calculate the ‘mean’?
2. The presenter makes a statement that “correlation isn’t necessarily causation”. In your own words describe what this means.

**Follow-up activity:**

Collect 20 books from around your house and record whether they have a hard or soft cover and if they are more than or less than 100 words. Display your findings in a two-way table.

This investigation could also be done by collecting data from DVDs and looking at movie ratings (such as G, PG, M) and duration of movies.

# NSW teacher notes

This is an optional standalone resource that could supplement student learning. The activities align with syllabus outcomes across stages and can be modified to meet the needs of your students. Students can complete the activities while learning at home and in the classroom. All activities can be completed without access to the internet or a device. Teachers could collect student work to offer feedback and as evidence of learning.

## Learning intentions

* To be able to create a two-way table to organise data involving two categorical variables
* To understand the data that is represented in a two-way table and draw conclusions from the data displayed

## Resources

* 20 books or DVDs for the follow-up activity

## NSW Mathematics K-10 Syllabus outcomes

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| --- | --- | --- |
| Outcome | Stage 3 | Stage 4 |
| Fractions, decimals and percentages | **MA3-7NA** compares, orders and calculates with fractions, decimals and percentages |  |
| Data | **MA3-18SP** uses appropriate methods to collect data and constructs, interprets and evaluates data displays, including dot plots, line graphs and two-way tables | **MA4-19SP** collects, represents and interprets single sets of data, using appropriate statistical displays |
| Single variable data analysis |  | **MA4-20SP** analyses single sets of data using measures of location, and range |
| Working mathematically | **MA3-1WM** describes and represents mathematical situations in a variety of ways using mathematical terminology and some conventions  **MA3-3WM** gives a valid reason for supporting one possible solution over another | **MA4-1WM** communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols  **MA4-3WM** recognises and explains mathematical relationships using reasoning |

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