Level 2 Statistical Reports Workbook

ANSWERS

Name:



By Liz Sneddon

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Exercise 1:

1) An observational study is where the person in charge of the study is collecting data through observations. For example, where people are asked to measure their height, count the number of devices they have, etc.

2) An experiment is where participants are randomly allocated into groups, and then asked to do a task where the data is collected. E.g., volunteers are randomly allocated to write with their dominant hand or non-dominant hand and then data is collected to see how long it takes them to write a paragraph.

3) The study is an experiment as the participants were randomly allocated into two groups – one group given ginger, and the other group given a placebo. As this is an experiment, they can make causation claims.

Exercise 2:

1) a) To find out more about a topic that is interesting and relevant to them. E.g., to show that their product is better than another companies; to show that business is healthy in the country.

   b) If I know who has written the report, I can critique the report knowing their bias. E.g., If a teacher writes a report on a student, they are biased in their own opinion of that student, and it may or may not be the same as teachers.

   c) We want to know what bias there might be in the report, due to who has paid for it. E.g., If a report comes out saying that sugar is good in our diet, and I know that the research was paid for by coke company - then I take the findings with a grain of salt, or in other words, I know that the study has been paid for by a company who is trying to sell their product.

2) I would be more likely to believe the headline from the World Health Organisation as they are more neutral in both their funding and their philosophy (and are not a business trying to sell me a product). Additionally, I would expect that the world health organisation has viewed a lot more research before writing their article, giving me more confidence in their report.

Exercise 3:

a)

Variable	Data types
Age group of people working in the scientific research services industry in NZ	Categorical

Measures	The age groups are split into even 5-year categories that aren't overlapping, except for the last category which is 65+ which contains more than 5 years. The percentage is a good measure as you can count the number of people in each age category and convert this into a percentage.
Evaluation	I wonder how they determined whether a person was working in the scientific research services industry. If the person decides themselves versus the researcher collecting the data – we would want to make sure that there is consistency in categorising a job as this. The 65+ age group is not the same size as the other categories, which are each 5 years. But the bar graph has this as being the same width, and to be more accurate, perhaps this should be a wider bar to visually show that this age group is more than 5 years, so that it is not misleading.

b)

Variable	Data types
Income band of adults in NZ	Categorical

Measures	Anyone with a negative income has been categorised as a "Loss." The income bands start going up by $1000, then $5000, and then later it goes up by $10,000, $30,000 and $50,000.
Evaluation	I wonder if having negative incomes classified as a "Loss" is the right decision, or whether it should actually show the values as this would be more accurate and give more information to the person reading the graph. But then it is also useful to classify it as a "Loss" as some people won't connect that a negative income means a loss and just think that there is a mistake in the graph. The categories are not evenly spaced out, which can be misleading, as it makes us think that there is a more even spread of incomes, when in fact there are far more incomes at the lower end which would give a right skewed distribution. Looking at the graph it doesn't match this.

c)

Variable	**Data types**
Whether their home is sometimes or always damp	Categorical

Measures	The graph displays the options of sometimes damp, and always damp.
Evaluation	I don't think that all of the options are displayed on the graph. For example, there must be other options such as "Never damp" etc. And the percentages don't add up to 100%, meaning that this is only around 20% of the data, which is quite misleading as around 80% of people do not say sometimes damp or always damp. Is there a consistent definition of "sometimes damp" and "always damp"? If the person has to decide if their home is sometimes damp, they might have different understandings of what "sometimes" means, and what "damp" means. For example, some people might think that their home is damp if they get a little condensation in one room, once a year. Whereas other people might think that their home is damp if there is water streaming down every window in the house.

d)

Variables	**Data types**
Employed people in different groups by the type of employment	Categorical
Chance of losing their job or business in the next 12 months	Categorical

Measures	The variable of employed people has a number of categories: causal, fixed term and temp agency, permanent, temporary, employers, self-employed. The variable chance of losing their job/business has 2 categories that we can see on the graph: medium or almost certain/high.
Evaluation	The categories showing of medium and almost certain/high for the variable chance of losing their job/business, are not all of the categories. There must be other categories such as "low chance" and "no chance." Not showing this information is misleading.

e)

Variable	**Data types**
Number of nights people heated their living area in winter in NZ	Categorical

Measures	There are several categories – every night, most nights, hardly ever, never.
Evaluation	I think that these categories are quite subjective. Every night and never would be fine, but I think people could have a different interpretation of "most nights" for example. Some people might say "most nights" is half a week, where others might think it is 6 or 7 nights per week. I wonder how well people's memories are of how often they heated their living area in winter. Winter is several months long and not everyone will remember accurately how often they heated their living area. Also, what months are winter? I don't think that everyone will have the same understanding of which months these are. E.g., some might say winter goes from June to October, where others may think it goes from July to September.

f)

Variable	**Data types**
Main reasons why people in NZ who own their home move house	Categorical

Measures	The different categories include" to move to a more suitable home, social reasons, education or work-related reasons, to move to a better-quality home.
Evaluation	There must be at least one more category as the percentages don't add up to 100%. I wonder if the question that people answered was an open question where they wrote an answer and then the researchers have classified them into these categories. Or whether participants were given a list of options to select. This could affect the accuracy of the data. What counts as a "social reason"? Is this something that participants would all have the same understanding of?

g)

Variables	**Data types**

Correct daily limit of salt	Could be Categorical or Numerical
If people know that processed foods in the main source of salt	Categorical
Whether people are interested in cutting down on the amount of salt	Categorical
Which medical conditions could be made worse by too much salt	Categorical
What people are concerned about	Categorical
Whether people look at the packaging to find out about the salt content	Categorical

Measures	For the daily intake of salt, this was put into categories of: don't know, lower, correct, higher. For the processed food being the main source of salt, this could be a yes/no question, or it could be a list where people select processed foods as one option. For cutting down on the amount of salt, we only know two categories – very or quite interested. For medical conditions, there ae several categories of which people could pick multiple categories: heart attack, high blood pressure, stroke, kidney disease, stomach cancer, osteoporosis. For what people are concerned about, the categories include: salt, saturated fat, sugar, artificial flavours. For whether people look at the packaging, there are several categories: no, yes – sometimes, yes – always.
Evaluation	For the processed food variable, we don't know what the question that was used is. It may have been a yes/no question, or it could have been a list where people select processed foods as one option. We need to know what the question was in order to be able to identify this. For the variable cutting down on the amount of salt, will there be a consistent understanding of "quite" or "very" interested. Will each person who says they are "very" interested have the same interpretation of this?

Exercise 4:

1) $\frac{50}{100} \times 100\% = 50\%$

2) This means that 30% of the people who were asked to do my survey responded. I have information / data about 30% of the people I asked.

3) A higher response rate is better as this gives me more information and therefore more confidence that I know more about a greater percentage of the people I'm interested in.

4) A low response rate means that I have only have data from a small percentage of those who I'm interested in. E.g., A response rate of 5% means that there is 95% of people I'm interested in whom I know nothing about. So, the higher the response rate the greater the accuracy and quality of data.

5) The highest response rate is from calling on the telephone, however this is still low at around 10%. Any forms that use the internet are the lowest at around 0.1%.

6) Face-to-face interviews have a higher response rate, so verbally or in person asking people to do a survey will increase the response rate.

7)

Method	Advantages	Disadvantages
Written questionnaire	Easy for people to fill in.	Costs to print and takes time to enter data afterwards.
Internet or email questionnaire	Very quick to send out	hard to get emailing list of target populations.
Face-to-face interview	get more truthful and accurate answers	Takes a lot more time to collect the data.
Telephone interview	Anonymous	takes time to collect data and time to enter the data.

8) Pen and paper might be useful in this situation as customers could easily fill it in while they are drinking their coffee in the shop. Printing out the survey has a small cost associated with it and requires time to create the survey. Then the answers need to be entered by hand which will take more time, which can be a disadvantage. Only current customers will go into the shop, and they won't survey other potential customers, missing out important representative data. This is a disadvantage.

Exercise 5:

1)

a)	Systematic	Random
b)	Self-selected	Biased
c)	Convenience	Biased
d)	Stratified	Random
e)	Cluster	Random
f)	Simple random	Random

2) Write each student's name on a piece of paper, and place this into a box. Then randomly draw out 10 students' names.

3) I would first separate the list of students into the class into a group of boys and a group of girls. Then write all the boys names on a piece of paper, placing these into a box. Then randomly select 5 boys out of the box. Repeat this with the girls, writing their names on paper, placing them in a box, and randomly selecting 5 girls.

Exercise 6:

1) a) Smaller sample sizes take a **shorter** time to collect data, but results are **less** precise.

b) Larger sample sizes take a **longer** time to collect data and results are **more** precise.

2) The sample sizes of both groups do NOT need to be the same, we want to use all the data that has been collected. However, the more data that we have, the smaller the margin of error.

Exercise 7:

1)

Groups excluded from target population	• Students in Year 7, 8, 9, 10, 11, 13 • Students in Year 12 who are NOT in Mrs Sneddon's Year 12 Stats class.
Respondents	Students in Mrs Sneddon's Year 12 Stats class who are at school on the day the survey is done.
Non-respondents	Students in Mrs Sneddon's Year 12 Stats class who: • are not at school on the day, • are at school but choose not to participate.

2)

Groups excluded from target population	Teenagers in Aotearoa NZ who: • do not attend school, • study for a qualification that is not NCEA (e.g., IB, Cambridge etc.)
Respondents	Teenagers in Aotearoa who responded to NZQA's survey.
Non-respondents	Teenagers in Aotearoa who: • Did not respond to NZQA's survey, • Do not receive the survey (e.g., if it is pen and paper and they moved addresses, or if it is an email, they may not have given their email address to NZQA).

3)

Groups excluded from target population	• People who live in their car or in a caravan, or others who don't have a mailbox, • People who are too young to read and write
Respondents	People who live in a house near Pakuranga Plaza who choose to respond.
Non-respondents	People who live in a house near Pakuranga Plaza who: • Choose not to reply to the survey, • Are away on holiday/hospital etc. and not at home to receive the survey, • Don't speak/read English.

4)

Groups excluded from target population	• People who are too young to have a cellphone (e.g., primary school kids and kids at daycare), • People who don't have a cellphone, • People who don't register their cellphone number.
Respondents	People who have a cellphone number that is registered, and who choose to do the survey.
Non-respondents	People who have a cellphone number that is registered on the list, and who: • Don't answer the phone call or text, • Answer the phone call or text but decline to participate.

Exercise 8:

a)

Variable:

Ages of people working in the scientific research services industry in NZ.

Response bias:

Most people will be comfortable sharing which age group they are in, and so that information would be reasonably accurate. However, people may find it difficult to identify whether they work in a "scientific research services industry." Therefore, the data may not be entirely accurate and reliable.

Improvements:

If the survey provided a list of jobs that count as "scientific research services industry," this would mean people can more easily identify if they work in this area and therefore the data would be more accurate and reliable.

b)

Variable: The annual personal income of adults in NZ.

Response bias:

Some people may feel uncomfortable sharing how much their personal income is for a survey. Additionally, some people may not easily know what their annual income is, for example if they work in an area such as real estate where they get paid on commission, to remember a whole year's income may not be very accurate.

Improvements:

Asking people to estimate their income over the last month may enable people to more accurately remember how much money they earnt, compared to trying to remember over the last year.

c)

Variable:

Number of people who are involved in environmental projects from different regions in NZ.

Response bias:

Most people will be comfortable sharing what region they live in, and know accurately what region this is, so I expect this information to be quite accurate. The information about whether they are involved in an environmental project is likely to be a little less accurate and reliable. Different people would have different interpretations or understanding of what an environmental project is. For example, some may count having their own vegetable garden as an environment project.

Improvements:

If the survey gave some examples of what an environmental project is, this would help get more accurate data, as people will be better able to define what is or isn't an environmental project.

d)

Variable:

The dampness level of New Zealanders homes.

Response bias:

I don't think there will be a lot of consistency in identifying how damp a home is, as people may have different definitions of what "sometimes damp" means. For example, some may say their home is sometimes damp when it has one or two windows with condensation once a week, whereas another person may interpret sometimes damp as meaning every window in their house is damp at least 3 or 4 days per week. This means our data is not as accurate as we would like.

Improvements:

If the question was changed to "how many days per week do you have condensation on your windows," and/or "what percentage of your house feels damp?" or similar type questions that collect numerical data rather than categorical data, will enable more accurate and consistent data to be collected.

e)

Variable:

- What type of employment relationship a person has: employee (casual, fixed term, permanent, temporary), employer, or self-employed.
- The chance of losing their job or business in the next 12 months.

Response bias:

I would expect that most people will be able to identify what type of employment relationship they have and understand the terminology that is being used. However, when people are interpreting what a low, medium, or high risk there is of losing their job or business, the data could be quite inconsistent. For example, someone may think that a "medium" chance is around 50%, where others may think this is around 30% or 70%. Additionally, how accurately people can identify this can be quite inaccurate. An employee might not know if the company has lost contracts and is going to make staff redundant till right before it happens.

Improvements:

When asking people about the chance of losing their job or business, they could use a scale or continuum, which has both the percentage (0% to 100%) and the words (low, medium, high) written on it. This may help the data be more accurate and reliable.

f)

Variable:

The number of nights that people heated their living area in winter.

Response bias:

Winter is about 3 months long, and some people may find it hard to remember how frequently they heated their living area 2 months ago if the survey was asked at the end of winter. If they were asked the survey question 6 months or more after winter, the data is likely to be even less accurate as people won't remember this after such a long period of time.

There is also the concern about the consistency of the data, as using "most nights" and "hardly ever" may be interpreted differently by different people.

Improvements:

The survey question could ask for numerical data rather than categorical data, such as asking "how many days per week did you typically heat your house?"

g)

Variable:

Reasons why people who own their own home move house.

Response bias:

Some people may have several reasons that were used to decide to move. For example, someone could have moved both for work related reasons (e.g., a new job), and a better-quality home (larger, newer). This data won't be as accurate as we'd like.

In addition, the category "social reasons" is very broad, and a lot of people may just select this, and it could include lifestyle changes, family reasons, etc.

Improvements:

Allowing people to select multiple answers would be helpful and enable more data to be collected, giving a more representative view of the many reasons people may move.

h)

Variable:

What unpaid work people aged 15-29 in NZ do.

Response bias:

When people say they do household work, cooking, etc., we don't know if this is a comparable and consistent response. For example, someone who makes themselves toast might count that as "cooking" where others might think that cooking means to make a whole meal such as dinner.

i)

Variable:

Cigarette smoking behaviour.

Response bias:

There isn't a category for casual smokers, those who might only smoke at parties. Also, some people will be reluctant to answer truthfully about whether they have smoked as they may feel that they would be judged by the person interviewing them. People may also not know whether or not cigarette smokers include e-cigarettes or not.

Improvements:

If the question was one that collected numerical data, that would be better. E.g., "how many times per day would you smoke?"

j)

Variable:

Number of adults who use e-cigarettes daily in NZ in different years.

Response bias:

Some people may not count vaping as an e-cigarette, and there may be other types of e-cigarettes that people may not be sure about if it counts or not. People's definition of e-cigarettes may have changed between 2016 and 2021, so that the data isn't consistently comparing e-cigarette usage over time.

Improvements:

When doing the survey, it would be useful to have a definition of what an e-cigarette is. This would increase the accuracy and reliability of the data.

Exercise 9:

1) Whether teenagers will truthfully say whether they have vaped or not is a concern. Some who have vaped may say they haven't because they don't want anyone to find out, and some who haven't vaped may say they have because the want to be "cool" or fit in.

2) Some teenagers will not want to share this information as they may have been bullied but don't want to talk about it. Also, to get consistent information about cyber-bullying is hard as some people may feel that a friend being sarcastic is cyber-bullying where others won't classify that.

3) People are often reluctant to share this information as they feel it is quite personal. Some may give a much higher value than they actually get as they want to appear well off, and others may give a very low value as they may earn money illegally that they don't want people to know about.

4) Weight can be a sensitive issue for some people. For example, some may have eating disorders that they feel uncomfortable sharing, and others may feel they may be judged or bullied if people know about their weight.

   Similarly with information about health, there is some information (such as STD's) that people may not want to share or for people to know about.

Exercise 10:

1)	Customers who feel strongly about the quality of the food or service are more likely to respond. So, people who are very positive or very negative are likely to respond, but people who are neutral or ok are less likely to respond.
2)	People who use the website *Rotten Tomatoes* would be over-represented in the participants. And people who feel strongly are more likely to give a review or rating of a movie. So, if they felt the movie was amazing or terrible, they are more likely to respond.
3)	Lifeguards all have to pass a swimming test, so they are more likely to be much better swimmers than the average person.
4)	Students who participate in the KBB Music Festival would likely be doing a lot more practice each week than the average person who plays an instrument. It also only represents people who play musical instruments typically in an orchestra, but this doesn't include all instruments, such as instruments specific to a particular culture, electric guitars, etc.

Exercise 11:

a)	Double negative – "didn't" and "fail"
b)	Double – barreled question. It asks if the teacher helped you "learn" AND made you "comfortable."
c)	Overlapping categories – the first two categories both include $5.
d)	Leading / biased question. It talks about how saving is the "right" decision.
e)	Offensive language.
f)	This is a sensitive topic, and it assumes that the respondent has done drugs, which may not be true.
g)	This uses slang / jargon. The word "bach" and "hols" are words that kiwis use to mean holiday home and holidays.
h)	Double negative – "nobody" and "left."
i)	Acronyms – ROFL (Roll On the Floor Laughing).
j)	Leading / biased question. This suggests that ice cream is the "best dessert."
k)	Double – barreled question. This asks people about both "period 1" AND "period 2".
l)	This has overlapping categories; they both include 5 hours.

Exercise 12:

1)

Sample size(s)	400,000 adults

Evaluate

This is a very large sample size, which leads to the sampling error being small. This will lead to the estimates the study produces on the level of education and their physical and emotional health being more reliable and precise.

Response bias

Variables
Level of education
Physical health
Emotional health

Evaluation

- How accurate is the data?
- Are there biases due to the situation/topic?

I expect that many adults would give accurate information on their level of education, but there may be some who feel embarrassed or uncomfortable sharing this information, so I expect that some people won't share this information, or may give false information, saying that they have a higher level of education than they actually do.

I expect that when asked about physical health, many adults will be comfortable sharing and give accurate information, but there may be some physical health data that they are uncomfortable sharing such as if they have an STD, their weight (particularly if they have an eating disorder or are very conscious or embarrassed about their weight).

I expect that when asked about their emotional health, the data collected is less likely to be completely accurate and valid, as many adults may feel uncomfortable sharing this information in a survey. For example, many have been raised in a society where we don't talk about mental health issues such as depression or anxiety, and men are expected to be stoic and not complain. This means adults are less likely to give truthful answers.

2) Purpose:

Study type	Observational
Purpose	The purpose is for the Ministry of Health to track obesity rates in Scotland, and the effect on other medical conditions and costs.
Audience	People and organisations who may be interested in this information would be doctors and medical hospitals and organisations who provide medical services. Other organisations involved in selling medical equipment or resources would also be interested in this information.
Source	The study was funded by Centre of Dietetics at the Ministry of Health in Scotland.
Evaluation	As the study was funded by the Scottish government I have a high level of confidence in the results, as they are more likely to be neutral in their study design, as they do not have a vested interest such as a business may. I also expect that the study design was done in a collaborative manner, which involved experts in the field, leading to a more considered and effective study design.

Features:

Population Measures & Variables	**Variables** / **Data types** Weight / Numeric, continuous Height / Numeric, continuous
Evaluation	As weight is something that is more easily measured at home, e.g., many people have their own bathroom scales that are easy to use, I would expect that this data would be quite reliable. There will be some variation as different scales are used rather than one set of scales that everyone uses, but I don't expect to much inaccuracy in these measurements. For height, some people may have a suitable measuring tape (such as one used in building) that they can measure their height with at their home. However, there will be some that don't have appropriate equipment to be able to measure their height accurately. If they have been to a checkup at their doctors, often the doctor will measure their height, using equipment that is more accurate than what is available at home.

Survey method	Telephone
Evaluation • Bias • Accuracy • Response rate • Cost • Time • Geographical coverage	Phone surveys have a number of advantages and disadvantages. One advantage includes a higher response rate than less personal methods such as emails and internet, as when talking to someone on the phone they may be more persuasive and encourage people to answer their questions. This also leads to answers being slightly more truthful and accurate than other methods, as the people asking the questions can add further explanations if needed to help them understand the questions. Another advantage includes the geographical coverage. When dialing phone numbers, you are able to call all areas within a country, and therefore get a wider representation of the population, e.g., rural and city people, areas in Scotland to the North, South, East, West, and Centre. Some disadvantages are that the cost and time required to collect data is higher as the government have to pay people to make the phone calls, which take a while to talk to each respondent. Another disadvantage is that not everyone in Scotland will have a landline phone or being available to answer questions. Some groups of people are more likely to answer and be at home, such as retired people or mums with young children. However homeless people are not likely to have phones, and people who live rurally may lose power due to the weather or being isolated.
Sampling method	Not specified – other than stating it was a random sampling method.
Evaluation • Random or biased • Is the data representative of the population?	A random sampling method was used, but we don't know specifically which type. Given that it is a phone survey it is likely to be a simple random sample where the computer generates a random phone number and dials it. A random sampling method is good as it means that the sample is much more likely to be representative of the population, leading to results being more representative.
Sample size(s)	1583 people aged 18 and older.

Evaluate

This is a large sample size, which leads to the sampling error being small. This will lead to the estimates the study produces on the obesity being more reliable and precise.

Selection bias

Target Population	Adults aged 18 and over in Scotland.
Sampling frame	People with a landline phone.
Groups excluded	People who have an unlisted phone number, such as police officers and other involved in supporting the law (lawyers etc.), people who value their privacy, etc. People who don't have a landline phone (homeless, people living in isolated areas, living in caravan parks, people who choose to have a mobile phone instead of a landline phone, etc.). People who are not at home when the phone calls are made, such as students at University or Technical colleges, full time workers, etc.

Evaluation

- Is the sample representative of the population?

In 2012, I expect that there were a very large percentage of the Scottish population who had a landline phone, and therefore I would think that the sample will be close to being representative of the population. The exception is that there are a few smaller groups of people who will either not be represented or will be under-represented in the data on obesity, and who may have different BMI values leading to a slight bias in the results. For example, people who have an unlisted phone number, such as police officers, may have lower weights and BMI values as fitness is one of the criteria to become a police officer, and many parts of their job require a higher level of fitness than in the normal population.

Nonresponse bias

Respondents	People who have a landline, without an unlisted phone number, are at home when called, and have the time and are willing to participate in a survey.
Non respondents	People who have a landline, don't have an unlisted phone number, and may not be at home when called, or don't have the time to answer a survey, or choose not to participate in a survey.

Evaluation	Nonrespondents may have different heights and weights than those who do respond. For example, students at University or Technical colleges are typically young, and they may have lower weights than middle aged or elderly people who have less time for exercise due to full-time work and looking after their family.
Response bias	**Variables** Height Weight
Evaluation • How accurate is the data? • Are there biases due to the situation/topic?	I expect that a lot of Scottish adults will know their approximate height (if they go to a doctor or hospital, they often measure their height and weight), and most adults don't grow in height after the age of 20. I expect that when asked about their weight people may not be as truthful, particularly if they have an eating disorder or are very conscious or embarrassed about their weight. This will lead to the data be less accurate than we would like, and the weights may be lower than they actually are.
Self-selection bias	People were selected at random, so volunteers are not the participants in this study.
Evaluation	NA
Survey bias	As the survey only collected data on height and weight it is unlikely to have any survey bias in terms of question wording etc.
Evaluation	NA

Conclusion:

Key Findings	37.9% of Scots were within the normal weight range in 2012, compared with 36.8% in 2011. Overweight and unhealthily obese Scots accounted for more than 60% of the population. Overweight people made up 34.7% of the Scottish population in 2011, and obese people 26.7% In 2012, 33.8% were overweight and 26.5% obese.

Overall evaluation	The observational study was carried out by the Scottish Ministry of health, where they carried out a random sample via Phone interviews. The random sample and phone interviews give a wide coverage of the population, so the data will be reasonably representative of the population. As the source of funding for the study and the purpose and researchers involved mean that the study design is likely to be of a higher quality and neutral in their purpose, I am more confident in the reliability of the results.
Link conclusion to the purpose	The headline is "Scots slimming down a wee bit," and the article claims that "obesity rates are declining." The percentage changes are only very small, so I'm not sure if there is sufficient evidence to make this claim. The purpose was to explore if there are changes in obesity which would help the Ministry of Health plan appropriately for treatment and resources of medical conditions associated with obesity.

3) Purpose:

Study type	Observational
Purpose	To explore whether children of mothers who drank heavily during pregnancy were more likely to suffer from hyperactivity and behavioral or emotional problems.
Audience	This would be of interest to anyone involved treating children with hyperactivity, behavioral or emotional problems, or those who are involved in monitoring the health and wellbeing of pregnant women as it would help develop advice and treatment for this. In addition, educators and people involved in managing behaviour and supporting children with these issues would be interested in the study results.
Source	Department of Epidemiology and Public Health in the UK.
Evaluation	As the study was funded by the UK government I have a high level of confidence in the results, as they are more likely to be neutral in their study design, as they do not have a vested interest such as a business may. I also expect that the study design was done in a collaborative manner, which involved experts in the field, leading to a more considered and effective study design.

Features:

<table>
<tr><td>Population Measures & Variables</td><td>
<table>
<tr><th>Variables</th><th>Data types</th></tr>
<tr><td>Amount of alcohol consumed during pregnancy (1-2 per week, occasionally, heavy/binge, etc.)</td><td>Categorical, ordinal</td></tr>
<tr><td>Hyperactivity</td><td>Categorical</td></tr>
<tr><td>Behavioral problems</td><td>Categorical</td></tr>
<tr><td>Emotional problems</td><td>Categorical</td></tr>
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<tr><td>Evaluation</td><td>The article doesn’t discuss how the amount of hyperactivity was measured, and how decisions were made as to whether a child has behavioral or emotional problems. I worry whether this was reported by the parent or diagnosed by a medical professional. If it was reported by parents, I worry if there is consistency among classifying. For example, one parent might say that a child having a temper tantrum once a week is a behavioral problem rather than being something an average 5-year-old child does as part of growing up.</td></tr>
<tr><td>Survey method</td><td>Not stated</td></tr>
<tr><td>Evaluation</td><td>NA</td></tr>
<tr><td>Sampling method</td><td>Not stated</td></tr>
<tr><td>Evaluation</td><td>NA</td></tr>
<tr><td>Sample size(s)</td><td>11,500 children</td></tr>
<tr><td>Evaluate</td><td>This is a large sample size, which leads to the sampling error being small. This will lead to the estimates the study produces on the relationship between the amount of drinking during pregnancy and hyperactivity, behaviour, and emotional problems, being more reliable and precise.</td></tr>
<tr><td>Selection bias</td><td>
<table>
<tr><td>Target Population</td><td>5-year-old children in the UK</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td>
<table>
<tr><td>Sampling frame</td><td>This is unknown without looking into the UK Millennium Cohort study.</td></tr>
<tr><td>Groups excluded</td><td>Mothers and children who don’t have a permanent address or have moved and aren’t able to be tracked.
Mothers and children who were not a part of the Millennium Cohort study, for example if they recently moved to live in the UK.</td></tr>
</table>
</td></tr>
<tr><td>Evaluation</td><td>Unable to evaluate this without knowing the sampling frame.</td></tr>
<tr><td>Nonresponse bias</td><td>
<table>
<tr><td>Respondents</td><td>Those participating in the Millennium Cohort Study in the UK, who were able to be contacted and agreed to participate.</td></tr>
<tr><td>Non respondents</td><td>Those participating in the Millennium Cohort study in the UK who chose not to participate or were unable to be contacted.</td></tr>
</table>
</td></tr>
<tr><td>Evaluation</td><td>Nonrespondent mothers may have drinking habits during pregnancy than those who do respond, along with nonrespondent children may have different levels of hyperactivity, behavioral and emotional problems. For example, mothers who are alcoholics may be less likely to agree to participate than non-alcoholics, and this could lead to quite different data.</td></tr>
<tr><td>Response bias</td><td>
<table>
<tr><th>Variables</th></tr>
<tr><td>Amount of alcohol consumed during pregnancy (1-2 per week, occasionally, heavy/binge, etc.)</td></tr>
<tr><td>Hyperactivity</td></tr>
<tr><td>Behavioral problems</td></tr>
<tr><td>Emotional problems</td></tr>
</table>
</td></tr>
<tr><td>Evaluation
How accurate is the data?</td><td>Mothers of children who are 5 years old were asked how much they drank during their pregnancy. This requires an accurate memory from 5-6 years prior, as well as being honest about what could be a very sensitive subject. For mothers to accept that their prior drinking may contribute</td></tr>
</table>

• Are there biases due to the situation/topic?	towards any hyperactivity, behavioral or emotional problems is difficult, and many may not reveal truthful and accurate answers to this question.
Self-selection bias	The article does not state if how participants were selected, therefore we do not know if they were volunteers or not.
Evaluation	NA
Survey bias	The wording of questions, order of questions, answer etc. are unknown.
Evaluation	NA

Conclusion:

Key Findings	"Heavy drinking during pregnancy leads to hyperactive kids." This headline suggests a causal link between drinking and hyperactivity, but the study was only an observational study and so only inferences can be made.
Overall evaluation	The observational study was carried out by the UK Department of Epidemiology and Public Health. The very large sample size of 11,500 children will give a lot of data, which reduces the sampling error and helps leads to the data will being more representative of the population. As the source of funding for the study and the purpose and researchers involved mean that the study design is likely to be of a higher quality and neutral in their purpose, I am more confident in the reliability of the results.
Link conclusion to the purpose	As this is an observational study, researchers can identify patterns in the data, but they are unable to determine if drinking in pregnancy causes (or leads to) hyperactive kids, as there are so many factors that have not been controlled and can affect children having hyperactivity, behavioral or emotional problems. The results will be useful to medical people involved with treating children as this will help develop their understanding and treatment of children in this category (mothers with high levels of alcohol consumption during pregnancy).

4) Purpose:

Study type	Observational
Purpose	The purpose of the study was to explore different smartphone apps that may be useful to travelers.
Audience	Any business that is involved in the tourist and travel area would be interested in these results as it may give information that would be helpful for their business.
Source	The study was conducted by an independent research company and was commissioned (paid for) by the New Zealand app maker TrApps.
Evaluation	The study was paid for by a company which has a vested interest in the results as they are investing money into the study with the expectation that it will help their business to make more money in the future. This would reduce my confidence in the trustworthiness of the study results, but the company did organise an independent research company to carry out the study, which increases my confidence in the results, but not as much as a study that was paid for by independent researchers.

Features:

Population Measures & Variables	**Variables** / **Data types** Whether or not campers use travel apps while on holiday. — Categorical, Nominal How they feel about their holiday (happy, very happy, etc.) — Categorical, Ordinal
Evaluation	I wonder whether there are people saying they felt happy or very happy about their holiday were consistent in their answers as this is a subjective measure.
Survey method	Not stated
Evaluation	NA
Sampling method	Not stated
Evaluation	NA

Sample size(s)	500
Evaluate	The sample size is ok, but a larger sample size would reduce the sampling error, meaning that the estimates and results would be more precise and reliable.
Selection bias	**Target Population**: People who travel around New Zealand **Sampling frame**: Camper aged 18 – 29 in NZ. (I'm not sure how they obtained this list). **Groups excluded**: People over the age of 29, and under the age of 18 in NZ.
Evaluation	Unable to evaluate this fully without knowing the sampling frame. But they only selected campers between 18 – 29 to participate in their study, and they may have very different experiences, knowledge and understanding of travel apps and how they can be used. For example, a younger person is more likely to be confident using a new app and is therefore more likely to use a travel app than a retired person. So, the study doesn't full represent the views of all travelers as it may be that some features need further development in order to be useful to people older than 29.
Nonresponse bias	**Respondents**: Campers aged 18 – 29 in New Zealand who were selected for the study and agreed to participate. **Non respondents**: Campers aged 18-29 in NZ who declined to participate in the study or were unable to be contacted.
Evaluation	Campers who don't use travel apps are less likely to respond to the survey, and so the results are not likely to be representative of all campers aged 18 – 29 in NZ.
Response bias	**Variables** Whether or not campers use travel apps while on holiday. How they feel about their holiday (happy, very happy, etc.)

Evaluation	Gather data about how people feel about their holiday is not a sensitive topic, so the data is more likely to be accurate.
Self-selection bias	The article does not state if how participants were selected, therefore we do not know if they were volunteers or not.
Evaluation	NA
Survey bias	The wording of questions, order of questions, answer etc. are unknown.
Evaluation	NA

Conclusion:

Key Findings	The headline is "Travel App makes Campers Happy." As the study only included people aged between 18-29 years old, this headline is misleading, as the results only apply to those in the age group for whom we have data. It would be wrong to assume that people outside of this age group would also report that travel app makes campers happy.
Overall evaluation	The observational study was carried out by an independent research company with funding from a business, TrApps. The sample size is only 500 and with the survey and sampling method being unknown, we cannot be sure whether the sample is representative of the population. In addition, as the observational study only used data collected from 18 – 29 year olds meaning that the results are only applicable to this age group. In conclusion, the study gives us some interesting results, and due to an independent research company carrying out the study, I have some confidence in the results, but I also have some concerns.
Link conclusion to the purpose	The results that travel apps are a useful tool for some travelers is helpful for many business involved in the tourism area.