

21. Statistics

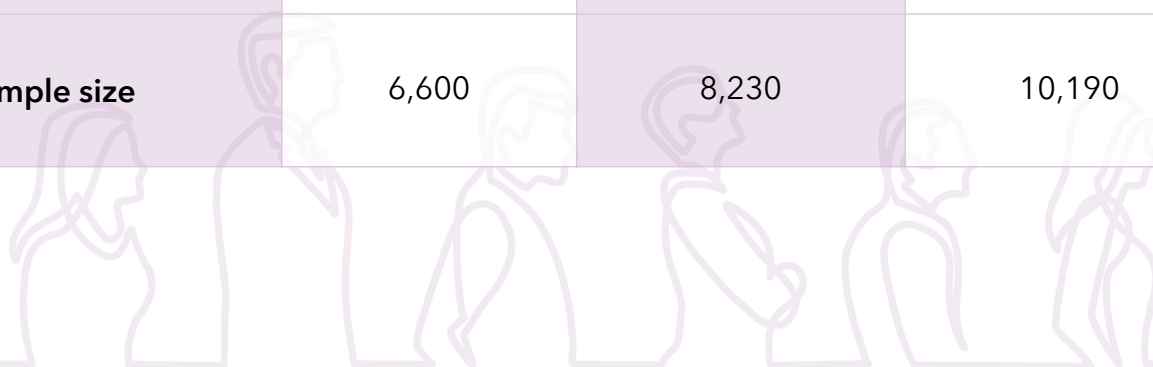
Analysing survey data relating to the impact of cost of living increases.

The Office for National Statistics (ONS) is responsible for collecting and publishing data relating to the UK's population and economy. As part of a school project on how the population is managing the period of high inflation between 2022 and 2023, you are tasked with analysing the ONS' methodology when dealing with extremely large datasets and drawing conclusions from their findings.

The tables below show the total populations and sample sizes for a range of different age groups within the general population over the age of 16.

Survey question	All persons	Aged 16 to 29 years	Aged 30 to 49 years	Aged 50 to 69 years
Population	52,140,015	9,906,720	17,299,501	16,062,196
Sample size	18,410	1,680	3,550	6,590

Survey Question	Aged 70 years and over	Men	Women
Population	8,871,597	26,549,780	25,590,235
Sample size	6,600	8,230	10,190



1. The ONS has chosen to sample the population for this survey.

- a. Why do you think they chose to select a sample rather than survey the whole population?

Sampling the whole UK population would have been very time consuming and expensive.

- b. What are the benefits and limitations of using a sample?

Answers may include the following points:

Advantages of sampling:

- **Cost-effective:** Surveying a sample is likely to be more cost-effective and more time-efficient than surveying an entire population.
- **Feasibility:** Surveying the entire population may not always be practical or feasible, especially when dealing with large or dispersed populations. Sampling allows researchers to study a representative subset of the population.
- **Accuracy:** Well-designed sampling techniques can yield highly accurate estimates of population characteristics, reducing the potential for errors.

Disadvantages of relying on a sample:

- **Sampling Error:** There may be a difference between the data collected from a sample and the data from the population due to the poor selection of the sample.
- **Representativeness and bias:** Ensuring that the sample is truly representative of the population can be tricky. There may be bias among the people selecting the sample which leads to parts of the population being over- or underrepresented. Additionally, some groups might be unwilling or unable to respond to the survey (e.g. older people might not be comfortable with an online survey).

2. Describe three different sampling methodologies that the ONS may have used to select this sample and explain some of the pros and cons of each approach.

Random Sampling:

Pros:

- It is simple and therefore likely a cheap method of sample selection.
- It is fair as every member of the population has an equal chance of being selected.

Cons:

- Requires a complete and accurate list to sample from.
- May not guarantee the representation of specific subgroups.

Stratified Sampling:

Pros:

- Can better ensure representation of different subgroups.
- Can be an efficient way of producing accurate samples that yield precise estimates.

Cons:

- Limited by how effectively and accurately the population is stratified. A failure to do this properly may result in over- or underrepresentation.
- More complex methodology than simple random sampling (as you first need to stratify the population).

Systematic Sampling:

Pros:

- Straightforward to implement and provides a structured approach.
- Random start and consistent interval for selection.

Cons:

- Requires a complete and ordered population list.
- Potential bias if there is an order in the list.
- Risk of non-representativeness due to underlying population patterns.

3. Calculate the proportion of the population that was sampled for each group and comment on any limitations of the sample sizes used and how these may impact survey results.

Survey question	All persons	Aged 16 to 29 years	Aged 30 to 49 years	Aged 50 to 69 years	Aged 70 years and over
Population	52,140,015	9,906,720	17,299,501	16,062,196	8,871,597
Sample size	18,410	1,680	3,550	6,590	6,600
% of population sampled	<i>0.04%</i>	<i>0.02%</i>	<i>0.02%</i>	<i>0.04%</i>	<i>0.07%</i>

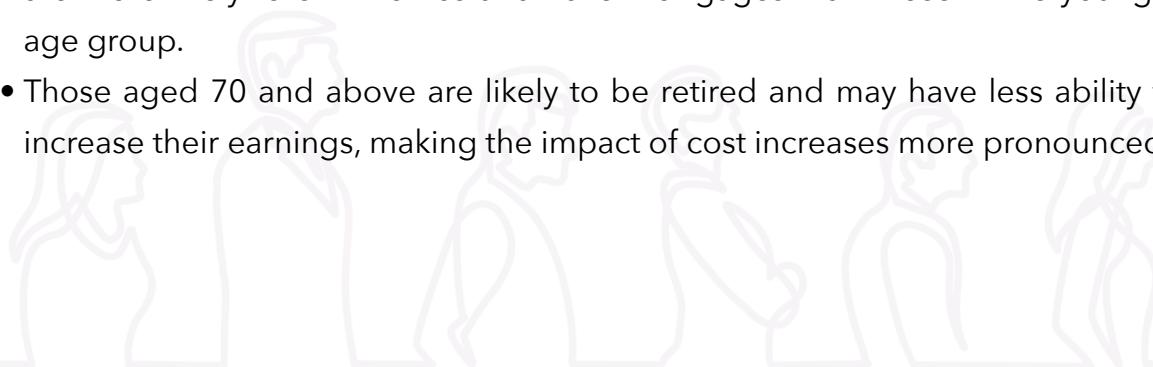
Sample sizes are a very small proportion of the overall population so there is a higher risk that bias or anomalies could impact the results. Students may comment on the relative representation per group. In older groups there were more responses than younger groups, which may reflect a bias in the sampling methodology or might indicate that older groups are more likely to respond to surveys.



4. Compare how cost of living changes in the last month may have impacted different age groups differently. Why do you think there has been a different perceived impact on young people versus older people?

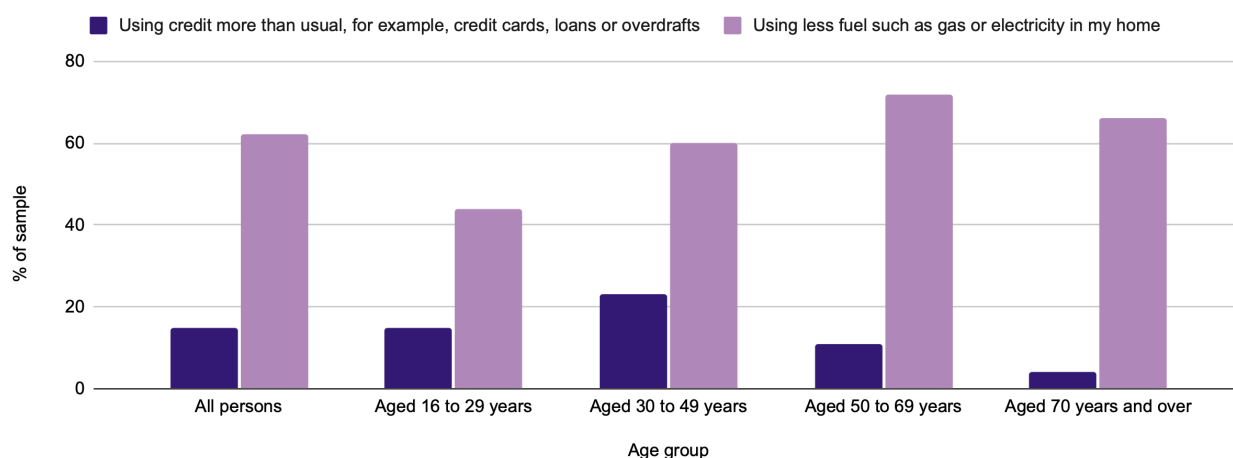
Has your cost of living changed compared to one month ago?					
Survey question and response options	All people	Aged 16 to 29 years	Aged 30 to 49 years	Aged 50 to 69 years	Aged 70 years and over
It has increased	76%	66%	78%	79%	79%
It has decreased	2%	2%	2%	2%	2%
It has stayed the same	22%	33%	21%	19%	19%

- A greater proportion of people aged 30 and above reported that their cost of living increased over the month versus people ages 16-29.
- The younger age group includes 16-18 year-olds who are more likely to live at home and have their costs paid for by parents.
- Mortgage costs have increased over this period and those aged 30 and above are more likely to own homes and have mortgages than those in the younger age group.
- Those aged 70 and above are likely to be retired and may have less ability to increase their earnings, making the impact of cost increases more pronounced.



5. Looking at the below graph, draw three conclusions about how different age groups are changing their spending habits during this time. Where possible, provide a possible explanation for your conclusions.

How people are responding to increasing cost of living



- Most people are trying to use less fuel and some people are relying on credit (i.e. borrowing) more than usual to meet their costs.
- More people under 50 than over 50 are increasingly reliant on credit during this time. This might be because younger people have more time to pay back debt and so lenders are more willing to lend to them.
- People aged 30 to 49 are most likely to be relying more on credit during this time. This might be because they have young families to support and their costs are highest.
- Those aged 70 and over are least likely to rely more on credit. This could be because this group is retired and has fewer costs.

