Communicating Data Uncertainty on GDP and Unemployment: Interviews with the UK Public

Johnny Runge
Abstract

This paper explores public perceptions of data uncertainty in relation to two economic variables: GDP growth and the unemployment rate. It builds on recent studies using randomised controlled experiments (Galvao & Mitchell, 2021; van der Bles et al. 2020). These have shown that communicating the uncertainty around economic figures can improve public perceptions of uncertainty, without undermining trust in the data. Through 20 online, semi-structured interviews with the UK public, this paper explores in more depth how people conceptualise and think about data uncertainty, and how they react to communication of this uncertainty. It found that many respondents do understand information about uncertainty, especially the broader point that there is some margin of error around economic estimates, though there is a tendency to confuse it with future uncertainty or forecasting uncertainty, rather than uncertainty about the past. It was generally easier for respondents to accept the existence of uncertainty around GDP estimates as they had fewer pre-conceived ideas about how GDP data was collected and whether uncertainty would exist. On the flipside, however, people tended to be much less interested in the uncertainty around GDP estimates, and sometimes said they preferred a single figure. In contrast, people were much more interested in the uncertainty around unemployment figures. However, the study shows that it can be more challenging to communicate data uncertainty for a well-known economic variable such as unemployment. Many respondents (wrongly) assumed unemployment data was based on benefit claimant or tax data which meant they thought unemployment figures should be readily available for the whole population. This led many to question the existence and large degree of uncertainty around the figures. Some respondents wondered whether the uncertainty was an acknowledgement that it was difficult to capture certain parts of the working and non-working population, particularly those “off the radar”, such as those working cash in hand, those not claiming unemployment benefits, casual workers, and so on. Due to its design and sample, the study cannot conclude whether providing uncertainty information affected the trust in unemployment figures, but some respondents feared that such ambiguity could be misused and interpreted in different ways, and a few respondents, including some who had previously expressed that they trusted economic figures, did not understand why figures could not be given more precisely, leading them to question the competence of data producers and the value of the figures.

Keywords: Data Uncertainty, Uncertainty Communication, Public Understanding, Economic Statistics

JEL classification: C82, E01, D80

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1 Introduction

Economic data like GDP growth and the unemployment rate are uncertain, due to sampling and non-sampling errors. While data uncertainty is well-recognised and understood by statistical offices themselves, the widespread practice of communicating headline economic estimates as point estimates arguably conveys a misleading degree of accuracy. Especially in the “post-truth” era where facts are increasingly contested, it is worth considering whether it is possible to be more open and transparent about the limitations of economic data, without reducing public trust in the figures.

This paper will explore public perceptions of data uncertainty in relation to two economic variables: GDP growth and the unemployment rate. GDP and unemployment are subject to different types of data uncertainty, according to Manski’s (2015) distinction between “transitory”, “permanent” and “conceptual” data uncertainty. GDP is characterised by transitory statistical uncertainty. This uncertainty stems from early data releases. These are subsequently revised as more information becomes available over time, and therefore the uncertainty is only “transitory”. In contrast, the unemployment rate is characterised by permanent statistical uncertainty. This uncertainty stems from sampling uncertainty due to a finite sample. For instance, the Office for National Statistics (ONS) in the UK collects unemployment data based on the Labour Force Survey (LFS) which is a large household survey of 37,000 households in the UK.

This paper builds on two recent papers in this field that have explored perceptions and communication of data uncertainty, using randomised controlled survey experiments with the UK public. Using a nationally representative sample of the public, these papers explored how people...
understand data uncertainty and how they react to different communication tools on GDP growth (Galvao & Mitchell, 2021) and the unemployment rate (van der Bles et al., 2020), respectively. These papers show that communicating data uncertainty can lead people to (rightly) perceive greater uncertainty, and find little evidence to suggest it undermines trust in the numbers and the trustworthiness of the source, though it does not increase trust either. The latter study suggests such results “could help reassure all communicators of facts and science that they can be more open and transparent about the limits of human knowledge” (van der Bles et al., 2020).

More research is needed to fully understand and evaluate the impact of uncertainty communication on public perceptions and trust. As such, this study explores people’s perceptions through semi-structured qualitative interviews. As far as we know, this is the first study on public perceptions of economic data uncertainty using this method. Therefore, it is an important addition to the existing literature, and it will help interpret existing survey studies and help design future ones.

The plan for the remainder of this paper is as follows. Section 2 details the methodology, including recruitment and sampling of interview respondents, and how the interviews themselves were structured and analysed. Section 3 reports the findings on GDP. Section 4 reports the findings on unemployment. Section 5 then discusses these findings, including how public perceptions of data uncertainty differ between GDP and unemployment, and why. The appendices contain supplementary materials. Appendix A details the characteristics of the interview sample. Appendix B shows the interview discussion guide used.

2 Design

This paper is based on 20 semi-structured online interviews with members of the UK public, each lasting 50 minutes. The interviews were completed in October 2020. The respondents were recruited by a market research company, MRFGR, to include a mix of people based on demographics such as gender, age, region, employment status, ethnicity, and economic interest. Appendix A shows details about the characteristics of the sample.

The semi-structured interviews were designed to be open-ended in nature, allowing the interviewer to follow up on interesting points, and to provide an in-depth and rich understanding of people’s perceptions of data uncertainty and revisions. The paper draws on a qualitative analysis of the interview transcripts, using a framework approach to code the data into common themes. This type of qualitative research is not representative of the views of the wider population, and the sampling is not done with this purpose. In contrast to surveys on this topic, the interview analysis cannot draw causal inference or generalise. While we have provided some indications of the frequency of certain themes, by using phrases such as “some”, “most”, “a few” and “a couple”, this is to make it more readable and to indicate how typical certain perceptions were in our sample rather than to generalise the findings. Instead, the value of the research is its ability to identify a broad range and diversity of views and experiences, and provide in-depth and rich insights. This will help interpret survey findings, and inform future studies in this area. The interview findings described in this paper should be considered within the context of its strengths and limitations.

2.1 Communication tools

The interviews used the most recent UK economic data available from the Office of National Statistics (ONS) at the time of the interview. For GDP, at the time of the research, this was the release of the first quarterly GDP estimate published on 12 August 2020. For unemployment, this was the release of the unemployment rate for June 2020 published on 13 October 2020. The interviewer shared their screen during the online interview to present these releases to respondents in the form of 13 different communication tools (shown below).

In the first half of the interview, this included five communication tools on GDP, adapted from Galvao & Mitchell (2021). They are shown in Table 1 below (G1 and G4-G7). Some of these were used as “main treatments”, meaning they were shown to the respondents first, where the researcher explored perceptions in detail. These were: G4 (predictive interval, used as main treatment 7 times), G6 (fan chart, used as main treatment 7 times), G5 (density strip, used as main treatment 3 times) and G1 (control, used as main treatment 3 times). All respondents were subsequently shown the other communication tools in turn (G4-G7), and asked for their thoughts and preferences.
In the second half of the interview, respondents were shown six communication tools on unemployment, adapted from van der Bles et al. (2020). They are shown in Table 2 below (U1-U6). These were shown in the same order to all respondents, asking for people’s thoughts about the statements, how they differed to other statements, and which ones they preferred.

The communication tools are shown in Table 1 and Table 2 below. The discussion guide (Appendix B) details how the researcher explored perceptions throughout the interview.

**Table 1. Data uncertainty communication tools on GDP**

<table>
<thead>
<tr>
<th>Group</th>
<th>Format</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Verbal communication tools</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G1</td>
<td>GDP is a statistic (“estimate”)</td>
<td>“GDP is estimated to have fallen by 21.7% during the last year.”</td>
</tr>
<tr>
<td>G2</td>
<td>Includes a confidence attribute (“about”)</td>
<td>“GDP is estimated to have fallen by about 21.7% during the last year.”</td>
</tr>
<tr>
<td>G3</td>
<td>GDP is a statistic subject to revisions.</td>
<td>“GDP is estimated to have fallen by about 21.7% during the last year. But this estimate is likely to be revised as updated information becomes available.”</td>
</tr>
<tr>
<td><strong>Verbal communication tools + graphs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G4</td>
<td>Information that GDP is a statistic subject to revisions. Likely quantitative impact of revisions using words and predictive interval.</td>
<td>G3 phrase above + “When this happens, it is still quite likely that GDP growth will be somewhere on the blue line between -22.3% and -21.1% (a 6 in 10 chance, or 60%). And it is quite unlikely that GDP growth will be outside the blue line (a 4 in 10 chance, or 40%).”</td>
</tr>
<tr>
<td>G5</td>
<td>Information that GDP is a statistic subject to revisions. Likely quantitative impact of revisions using words and density strip.</td>
<td>G3 phrase above + “When this happens, ONS estimates that GDP growth is most likely to be in the dark blue area (3 out of 10 times) and within each pair of lighter blue areas on a further 3 out of 10 occasions. ONS are very confident that GDP growth is somewhere in the total blue area, and will fall outside very rarely (1 out of 10 times).”</td>
</tr>
<tr>
<td>G6</td>
<td>Information that GDP is a statistic subject to revisions. Likely quantitative impact of revisions using words and fan chart.</td>
<td>G3 phrase above + “When this happens, ONS estimates that GDP growth is most likely to be somewhere around -21.7% (where the graph is highest) but there is also a chance that GDP growth will be different. GDP growth is most likely to be in the dark blue area (3 out of 10 times), and within each pair of lighter blue areas on a further 3 out of 10 occasions. ONS are very confident that GDP growth is somewhere in the total blue area, and will fall outside very rarely (1 out of 10 times).”</td>
</tr>
<tr>
<td>G7</td>
<td>Confidence intervals similar to ONS (2020)</td>
<td>“GDP is estimated to have fallen by about 21.7% during the last year. But this estimate is likely to be revised as updated information becomes available. There is approximately a two-in-three chance that...”</td>
</tr>
</tbody>
</table>
the “final” GDP estimate will be within the confidence intervals shown.

Table 2. Data uncertainty communication tools on unemployment

<table>
<thead>
<tr>
<th>Group</th>
<th>Format</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal communication tools on the current level of unemployment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U1</td>
<td>Point estimate + uncertainty statement</td>
<td>“Official figures by the Office for National Statistics (ONS) for June 2020 show that the UK unemployment rate is 4.1%, equivalent to 1.4 million people. There is some uncertainty around this figure: it could be somewhat higher or lower.”</td>
</tr>
<tr>
<td>U2</td>
<td>Range</td>
<td>“Official figures by the Office for National Statistics (ONS) for June 2020 show that the UK unemployment rate is between 3.9% and 4.3%, equivalent to between 1.31 million and 1.48 million people.”</td>
</tr>
<tr>
<td>Verbal communication tools on the change in unemployment during last year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U3</td>
<td>Point estimate, no uncertainty</td>
<td>“Official figures from the Office for National Statistics (ONS) for June 2020 show that UK unemployment rose by 104,000 during the last year.”</td>
</tr>
<tr>
<td>U4</td>
<td>Point estimate + uncertainty statement</td>
<td>“Official figures from the Office for National Statistics (ONS) for June 2020 show that UK unemployment rose by 104,000 during the last year. There is some uncertainty around this figure: it could be somewhat higher or lower.”</td>
</tr>
<tr>
<td>U5</td>
<td>Range</td>
<td>“Official figures from the Office for National Statistics (ONS) for June 2020 show that UK unemployment rose by somewhere between 1,000 and 211,000 during the last year.”</td>
</tr>
<tr>
<td>U6</td>
<td>Point estimate + sample uncertainty</td>
<td>“Official figures from the Office for National Statistics (ONS) for June 2020 show that UK unemployment rose by 104,000 during the last year. The data comes from surveys of households. It is not possible to survey every household each month, so these statistics are estimates based on samples.”</td>
</tr>
</tbody>
</table>

Section 3 and Section 4 will present the findings on public perceptions of data uncertainty separately for GDP and unemployment. Section 5 will discuss the findings together, including highlighting the similarities and differences in perceptions between GDP and unemployment.

3 GDP data uncertainty

The first half of each interview explored the 20 respondents’ perceptions of data uncertainty in relation to GDP growth.

3.1 Prior knowledge of GDP growth

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1 The 95% confidence interval was actually between -3,000 and 211,000. It was decided to simplify the communication by using +1,000 rather than -3,000. This made the wording simpler, and avoided potential further skepticism that unemployment might have decreased during this period.
The interviewer first explored respondents’ prior knowledge about GDP, as this has been shown to be important in driving people’s perceptions of GDP data uncertainty (Galvao & Mitchell, 2021). It also gave the researcher the opportunity to define GDP to the respondents prior to being shown the communication tools.

Overall, 11 out of 20 respondents correctly defined GDP when they were shown a multiple-choice survey question on their screen in the beginning of the interview. This was in line with results in a nationally representative survey with an identical question where 55% correctly defined GDP (Galvao & Mitchell, 2021). The interviews, however, showed that even among respondents who could identify the correct definition of GDP from a list of option, their understanding of GDP was sometimes relatively limited, which is in line with recent qualitative research (Runge & Hudson, 2020). When respondents were asked to define GDP in their own words before they were shown the survey question, they broadly gave four different answers. First, a number of respondents defined GDP broadly correctly, relating it to the total value of the country’s finances or earnings, or as the health of the economy. They all answered the subsequent multiple-choice question correctly. Some examples were:

*How fruitful we financially are as a country, the finance we have as a country.* WOMAN, 21, STUDENT.

*The wealth of the country divided by the population.* MAN, 33, FINANCE SYSTEMS MANAGER.

*It’s the total gross, national income or earnings, that a nation state produces or earns, from its population and across all industries.* MAN, 47, SENIOR RELATIONS MANAGER.

*I know it’s how they measure the health of the economy and the growth of the economy.* MAN, 40, CIVIL SERVANT.

Second, a couple of respondents said they had “never heard of it”. Third, some respondents said they had definitely heard about GDP and they had seen it in news stories, but they were “not sure” what it was. Some of these respondents guessed correctly in the subsequent multiple-choice question.

*I’m not really sure, but I see it written down a lot.* WOMAN, 34, RECEPTIONIST

*I’ve heard of it, but I can’t put it into words, I’m not sure.* WOMAN, 55, MYSTERY SHOPPER

*God, I think I know, but when you ask me that, I don’t know it, do I?* WOMAN, 56, HEALTHCARE DIRECTOR

Fourth, the remaining respondents said they had heard of GDP, but went on to define it inaccurately. Some were completely wrong, for instance by relating it to GDPR (General Data Protection Regulation) or as increases in prices. Others had the right idea that GDP was related to the output of the country, but related it to exports, with the implicit assumption that goods and services only became valuable once it was sold and exported to other countries, and went on to define it as the difference between exports and imports in the multiple-choice question. For example:

*GDP is basically the amount a country produces and earns in selling products and services.* MAN, 55, RETIRED

After answering the multiple-choice question, correctly or incorrectly, all respondents were shown a definition of GDP on their screen which was read out to them:

‘Gross Domestic Product (GDP) is the total value of goods and service produced in the UK. When GDP goes up, the economy is growing – people are spending more, businesses may be expanding. This is called GDP growth, and it is a key measure of the economy’s performance. When GDP goes down, the economy is contracting and GDP growth is negative – people are spending less, businesses may be closing.’

This meant that all respondents saw the communication tools, with a basic degree of knowledge about what GDP was.

### 3.2 Perceptions of GDP data uncertainty

The main initial reaction to all communication tools on GDP was to focus on the point estimate (minus 21.7%), rather than any of the information on uncertainty. Most respondents recognised that it was a
very large fall in GDP. Some said they were not surprised about this due to the impact of the pandemic and lockdown, especially the impact on businesses. Others said they had expected the fall to be even larger. Some typical examples were:

I think it is a large amount, and that doesn't surprise me. That information is what I would have expected to have happen. MAN, 55, RETIRED, PREDICTIVE INTERVAL.

I understand why it has fallen. It's understandable as businesses are closing. It's quite sad to see these figures really. WOMAN, 55, MYSTERY SHOPPER, PREDICTIVE INTERVAL.

It's believable, because most of the shops have been shut for half a year, so I totally understand that has happened. WOMAN, 39, RECEPTIONIST, PREDICTIVE INTERVAL.

It's very revealing numbers, in a negative way… I thought it would be down, but I wouldn't have expected it to be that much. MAN 42, SOFTWARE ENGINEER, DENSITY STRIP.

It makes sense to me, that it has gone down. MAN, 63, CARE WORKER, FAN CHART.

Taking into consideration Corona and everything, it makes sense. There's a lot of businesses shutting down, furloughing and lockdown. I would have thought actually it might be even higher, actually. WOMAN, 29, COMPLAINTS HANDLER, FAN CHART.

The interviewer then asked respondents directly what they thought about the information in the second paragraph of the statement and in the graph, and whether they understood it. Some respondents said they struggled to understand the information:

Oh gosh, when I see figures, it just goes over my head. Oh my God, I don't understand this. WOMAN, 45, STUDENT NURSE, PREDICTIVE INTERVAL.

It's very difficult to understand what this means. I mean, I think you have to be an accountant to understand what they are trying to say here. I don't understand it… I'm just interested in the figures. I'm not really interested in the nuances of why and where. MAN, 66, PROPERTY DEVELOPER, FAN CHART.

Some respondents, who did understand the uncertainty information themselves, noted that the general public would either struggle to understand the information or not be interested in it. An example was:

I think generally people would complain and say I don't know what you are talking about, basically. It would confuse the matter a lot more. Is it 21.7% or not? That's all I want to know. But for me, I know what they are trying to say there, that there is a margin of error. MAN, 40, CIVIL SERVANT, CONTROL.

However, there were also many respondents who explained the uncertainty statement fairly well, often helped by and using the information that was still available to them on the screen. Examples from respondents who were shown the predictive interval were:

The main point is we have lost a lot of GDP. And it's going to fall in-between a certain bracket. There's a 60% chance it will, and 40% chance it might not fall in that bracket at all. WOMAN, 39, RECEPTIONIST, PREDICTIVE INTERVAL.

I get what they are saying. It will be somewhere in that range. MAN, 55, RETIRED, PREDICTIVE INTERVAL.

The main point is, the blue point on the graph is the range it could fall into, so it could be between like 22.3% and 21.1%, and there is a 60% chance it will fall within there. But there is also a chance it could be either side. Basically, it's the best probability of their estimate. And the blue dot, is like what we used as the benchmark. MAN, 33, FINANCE SYSTEMS MANAGER, PREDICTIVE INTERVAL.

Similarly, examples from respondents who were shown the fan chart included:

GDP is probably gonna fall in that dark blue area more times than not, and it is hardly ever gonna go too far out of the estimates, because we always have quite a good idea of what GDP is. MAN, 23, EVENTS MANAGER, FAN CHART.

It's saying there is a 30% chance that GDP growth will be in that band, that's the highest probability of where the growth percentage will fall. But it is also probable that it will fall in other bands, and very, very unlikely, one out of 10 times, it will fall outside of that. MAN, 47, SENIOR RELATIONS MANAGER, FAN CHART.
It’s most likely to be in the middle, in the dark blue, but there is a chance that it is not that, it might be more of it might be less. WOMAN, 34, RECEPTIONIST, FAN CHART., Fan chart.

It’s going to be pretty much stable in the blue area, and it is not very often it will go out. 1 in 10 times. MAN, 63, CARE WORKER, FAN CHART.

Basically 3 times out of 10 what they have predicted will be right. The other 3 times out of 10, it will fall into Plan B area, and very rarely did they get it totally wrong that it is completely outside those margins. WOMAN, 29, COMPLAINTS HANDLER, FAN CHART.

Compared to the unemployment treatments, which are analysed in the next section, very few respondents made further points about this uncertainty at this stage. The examples below show the rare cases where respondents questioned why this information was given, or showed surprise about the amount of uncertainty in the numbers.

I would say that 3 out of 10 chance that it is actually in the dark blue area is not that high. I would have would have thought it would be higher, that they would be more confident in their statistics, but I appreciate that not that much information has necessarily been available to them. But it is good that only 1 out of 10 times it is completely out of their estimated area. WOMAN, 21, STUDENT, FAN CHART.

I understand what they are saying, but I don't know why they are saying it, because you have already given us an approximation, so we already know it's give or take, but if that's the way they work it out, then fair enough. WOMAN, 39, RECEPTIONIST, PREDICTIVE INTERVAL.

Respondents were subsequently asked questions about the perceived accuracy of the estimates. Respondents generally answered this question in fairly vague terms, and they did not always understand what was meant by the question. Among those who answered more concretely, there was a mix of responses, with some emphasising the perceived uncertainty and others the accuracy of the estimates. No respondents in the sample referenced the uncertainty information provided in their communication tool directly, however, though this may still have affected their answer:

It’s the best guess, but it’s not certain. It’s a long way from 100%. MAN, 47, SENIOR RELATIONS MANAGER, FAN CHART.

It sounds plausible to me, so I would say it is probably accurate. WOMAN, 34, RECEPTIONIST, FAN CHART.

I'd say it's probably fairly accurate. It's not gonna be a 100%, probably within 5%. WOMAN, 55, MYSTERY SHOPPER, PREDICTIVE INTERVAL.

Yeah, quite accurate. If they say it's fallen they must have had tools to measure the GDP in the last year, to come up with this figure. WOMAN, 45, STUDENT NURSE, PREDICTIVE INTERVAL.

It’s factual information. The statistics have been in the press, in the media, it’s factual. MAN, 53, CIVIL SERVANT, PREDICTIVE INTERVAL.

I’m not sure whether they could come with the exact figure. It’s probably an estimate, I would think. WOMAN, 64, UNEMPLOYED, CONTROL.

Respondents were also asked whether they would be surprised if GDP had fallen by more or less than the estimate, and how much more before they would be surprised. Again, it was very rare that respondents referenced the uncertainty statements that were still on their screen. Only two respondents did this directly:

Looking at that graph, there’s obviously not that much difference between falling 21.7% and 23%. So I’d feel confident it was in that range. WOMAN, 21, STUDENT, FAN CHART.

Anywhere on that graph, I wouldn’t be surprised. MAN, 47, SENIOR RELATIONS MANAGER, FAN CHART.

Instead, respondents seemed to use their knowledge of the Covid pandemic and lockdown, and the fact that they expected the economy to have been hit very hard. However, it should be noted that while respondents did not reference the uncertainty information directly, it may still have affected their thoughts. Generally, most interview respondents revealed a downside risk assessment to the estimate, due to Covid. Most respondents said they would not be surprised if GDP had fallen by even more than 21.7%. The examples below also illustrate that people picked ‘random’ growth numbers, rather than the ones provided in the communication tool about uncertainty.
I wouldn't be shocked if it fell to minus 30%. MAN, 23, EVENTS MANAGER, FAN CHART.

I would be very shocked if it had fallen by more than 50%. WOMAN, 21, STUDENT, FAN CHART.

More than 30% would be shocking. WOMAN, 29, COMPLAINTS HANDLER, FAN CHART.

I would not be surprised if it was anywhere, even up to 30%, it would still not be completely surprising for me, given what we have been through, and that it takes time for these figures to come in. MAN, 47, SENIOR RELATIONS MANAGER, FAN CHART.

I could imagine it falling by as much as another 5%. MAN, 55, RETIRED, PREDICTIVE INTERVAL.

I am surprised it's at 21.7%, so if it went ever further down, it would be a big surprise. MAN 42, SOFTWARE ENGINEER, DENSITY STRIP.

As high as maybe 40%, with the amount of people who has lost their jobs and places closed. WOMAN, 34, RECEPTIONIST, FAN CHART.

I am not surprised when looking at the number of places that are lying empty. Beyond say 40% would make me shocked. MAN, 58, ARTIST, CONTROL.

If they add another 15-20%, then I would be surprised. WOMAN, 64, UNEMPLOYED, CONTROL.

It depends. If it was 30%, I would be struggling. I would be querying, are they doing it in the right way? If it was like 25%, I’d say, well yeah, give or take, it's probably roundabout right. MAN, 40, CIVIL SERVANT, CONTROL.

In contrast, and again due to the pandemic, many respondents said they would be more surprised if GDP had fallen by less than 21.7%. Some examples were:

Given Coronavirus, if it was quite a minor fall, I would be quite surprised, as the economy has been halted. WOMAN, 21, STUDENT, FAN CHART.

Yeah, I probably would be surprised if it had fallen less, after 6-7 months of the economy struggling. WOMAN, 64, UNEMPLOYED, CONTROL.

I’d be very surprised. I would expect it to be more. WOMAN, 39, RECEPTIONIST, PREDICTIVE INTERVAL.

In a way, for some reason, I feel the optimistic scenario is less likely, if we performed better than expected. If it came in at 10%, I’d be sceptical. They are trying to cover something up, they are trying to sugar-coat this. MAN, 47, SENIOR RELATIONS MANAGER, FAN CHART.

Yes, I would be surprised if it fell by less than 21%. But even 15% would still be pretty high I guess. WOMAN, 29, COMPLAINTS HANDLER, FAN CHART.

I would be shocked if it fell by -10%. Because of Covid I can’t see it being any less than -10%. MAN, 23, EVENTS MANAGER, FAN CHART.

Again, it should be noted that some respondents noted that they did not have much confidence in any of their answers, due to their limited knowledge of GDP. Sometimes, this was implied by the lack of confidence in their answers, and at other times they recognised this directly, such as these examples:

I don't really know what GDP is, I would not be surprised by much, as I don't really know what is really bad and what is really good. WOMAN, 21, STUDENT, FAN CHART.

I would have expected it to have fallen, but I don't have any concept of what the figures means. MAN 42, SOFTWARE ENGINEER, DENSITY STRIP.

As part of their main communication tool, all respondents were told that the estimate “is likely to be revised as updated information becomes available”. After the communication tool was removed from the screen, respondents were told that the ONS publishes regular revisions to their GDP estimates, and were asked why they think they do so. Some respondents identified that it was due to updated information:

It could be based on data that's not complete yet. It could be based on trends. MAN, 47, SENIOR RELATIONS MANAGER, FAN CHART.

Information that wasn't available at the time or information that was late of difficult to get hold of. MAN, 55, RETIRED, PREDICTIVE INTERVAL.
I guess data is still coming in. When they publish something, they are still getting data, and they have not had a chance to look at that data, and they have to revise that figure. MAN 42, SOFTWARE ENGINEER, DENSITY STRIP.

I suppose in a sense, it's like a business plan... They have to give an estimate because they need to show some sort of figures, but obviously when the time arrives they can accumulate the correct percentage or figure then, but they have to give a guestimate. MAN, 63, CARE WORKER, FAN CHART.

Some respondents associated the potential lack of information with Covid and the unique economic circumstances, and it was not always clear whether they thought this would also happen during normal times:

I guess when they make their initial statistics, they don't necessarily have all the available information available to them. Because when there is something like a crisis like this, the information that would affect GDP would definitely not be available to them until a later stage. And they might not have as many stats from as many companies or households or whatever as they would like. Having 2 people's data compared to having 100 people's data would make a big difference. WOMAN, 21, STUDENT, FAN CHART.

There are businesses who obviously haven't pulled all their figures together. They haven't got the staff in to do all the figures. They have been firefighting. Let's say a factory has been shut down for 6 months, you are not going to get their figures, are you? So I can understand why they are doing revisions. WOMAN, 56, HEALTHCARE DIRECTOR, DENSITY STRIP.

Finally, there was a relatively large proportion of respondents who either did not fully understand the question, or spoke about "revisions" as updated numbers for future time periods. Examples were:

Everything is always changing, they might say a number, and a forecast changes, or something happens with Brexit... There are so many different factors. If they find a solution to Covid, or a different medicine, or they have a new local lockdown. So the numbers are always moving, so they always have to revise the forecast. You can't just have a number and stick to it, it's a rolling number basically. MAN, 33, FINANCE SYSTEMS MANAGER, PREDICTIVE INTERVAL.

Because there is continually new data coming in due to events, everything is influenced by events that can be unpredictable. MAN, 47, SENIOR RELATIONS MANAGER, FAN CHART.

This was a general theme in all the discussions about GDP uncertainty throughout the interviews. Many respondents instinctively thought about uncertainty in relation to future uncertainty, i.e. they took the uncertainty information to mean that the figures may change for future periods as the economic circumstances change, for instance due to the furloughing scheme ending and more businesses being forced to close, rather than uncertainty about the numbers for the specified period, i.e. that the figures might be revised and adjusted due to more accurate information that was not available at the time. This common theme shows it is much easier for the public to understand the concept of data uncertainty in forecasts of future trends. For instance, these respondents said they would not be surprised if economic growth improved in the future.

I would expect it to get better, rather than getting worse. People are getting back into the economy, even if it is with limited activities and smaller crowds. MAN, 33, FINANCE SYSTEMS MANAGER, PREDICTIVE INTERVAL.

It depends what happens in next few months, especially in key industries, and with the lockdown. It could get even worse. If things stay as now, I expect things to gradually improve. WOMAN, 56, HEALTHCARE DIRECTOR, DENSITY STRIP.

3.3 Evaluation of different communication tools

During the interviews, the communication tools were either shown as “main treatments” or subsequently as another way of presenting the same data. In this section, we will present further specific findings for each of the quantitative communication tools, synthesising the views of all those respondents who were shown it in one way or another. The GDP communication tools have been evaluated in Galvao and Mitchell (2021) through a randomised controlled survey experiment. They found evidence that the tools improve people’s understanding of uncertainty around the point estimate, without undermining trust in the figures. The findings below supplement and explain these findings.

The most well-received communication tool was the one using a ‘predictive interval’ (G4), giving a point estimate followed by a range, and a description of how often GDP growth is likely to be within that range. Many respondents preferred its simplicity compared to other communication tools. People
often recognised it did not contain as much detailed information as some of the other communication tools, but said they only needed to know that there was some uncertainty around the estimate and that this communication tool showed this clearly. Some examples were:

I prefer the lumping of chances, compared to the overly gradual [in the fan chart]. I can appreciate this is because I don’t have a huge knowledge of the economy, and other people might want things to be more specific. To me this is just clearer. I know the general ballpark and the likelihoods makes sense to me. MAN, 33, FINANCE SYSTEMS MANAGER.

This one is easier [than the fan chart]. It’s simpler. I combines some of the categories, likely and highly likely, and then everything else on the outside. WOMAN, 29, COMPLAINTS HANDLER.

They are just saying that the ONS data is pretty much bang on, and they are just waiting for the last information that could move it outside the line, but it is very unlikely that it will move. I think it is better [than the fan chart]. It’s more visual. The other one was too confusing. I didn’t understand all the percentages. This is a simple line graph. MAN, 23, EVENTS MANAGER.

I think it’s simpler. I says the same information [as the other ones], but just more simply. MAN, 47, SENIOR RELATIONS MANAGER.

That’s much easier to read [than all the other ones]. It tells me the figures much clearer, and what the chances are it falls outside that range. MAN 42, SOFTWARE ENGINEER.

A couple of respondents said they preferred other treatments as they contained more detailed information, including that the middle point was considered the most likely. Generally, many respondents recognised the similarities between the density strip (G5) and the fan chart (G6), which both showed the likelihoods of different outcomes in different ranges, but illustrated it in a different graph. Generally, respondents said they were complicated to understand, especially the meaning of the y-axis in the fan chart. Most respondents had little preference between the two. Some respondents noted that the percentage probabilities (which was included in the fan chart but not in the density strip) made it much easier to interpret the graph, and this should be added to the density strip in future reiterations.

The last communication tool showed the historical path of GDP growth, alongside a confidence interval. This communication tool was not well-received by respondents. While people thought it was interesting to see the historical path of GDP growth, and found it fascinating and scary to see how much it had dropped, they did not understand the uncertainty information shown in this communication tool. In particular, this included confusion about the term ‘confidence intervals’. Some examples were:

I don’t know what a confidence interval is. But I guess it’s kinda interesting to compare it to previous years. WOMAN, 21, STUDENT.

I don’t understand this one. Where are the two intervals? It’s the hardest one to understand. It is interesting to see the path, but it is not presented in a good manner. WOMAN, 29, COMPLAINTS HANDLER.

It’s really technical and complicated. I don’t know what confidence intervals are. MAN, 23, EVENTS MANAGER.

I find this one quite confusing. I don’t understand, what are the confidence levels? Is that the left hand axis? MAN, 47, SENIOR RELATIONS MANAGER.

I can see just how bad this year has been. Gosh, that is bad, innit? WOMAN, 39, RECEPTIONIST.

Look at that graph. A year ago that would have been completely fictitious. When you see it fall off a cliff, shocking. WOMAN, 56, HEALTHCARE DIRECTOR.

4 Unemployment data uncertainty

The second half of the interview explored the 20 respondents’ perceptions of data uncertainty in relation to unemployment rate statistics in the UK.

4.1 Prior knowledge of the unemployment rate

The interviewer first explored respondents’ prior knowledge about the unemployment rate, including how they would define it, how they thought it was collected, and who they thought it was published by.
Compared to GDP, unsurprisingly, respondents were much more confident in discussing the unemployment rate. All respondents knew that the unemployment rate had something to do with people’s labour market situation, but they offered a wide variety of definitions. First, some respondents used the “unemployed” terminology in their definition of the unemployment rate, stating it was how many people were unemployed in the country:

In the country overall, how much of the population is unemployed. WOMAN, 29, COMPLAINTS HANDLER.

Amount of people within the country who are unemployed at any one time. It can go up and down. WOMAN, 48, NURSERY NURSE.

How many people are officially unemployed. MAN, 63, CARE WORKER.

Number of people who are unemployed as opposed to employed. WOMAN, 62, RETIRED

Second, some respondents said the unemployment rate showed how many people did not have a job:

The amount of people who don't have a job, who have lost their job through for instance Covid. MAN, 53, CIVIL SERVANT

It's how many folk are out of a job. WOMAN, 55, MYSTERY SHOPPER

If you are unemployed, you don't have a job. I'm gonna guess it means that if you said 30% of the British public was unemployed, then it means 70% are working. WOMAN, 39, RECEPTIONIST

Third, some emphasised that the figures were derived among the working-age population:

It’s the current percentage of the adult population who are not in a form of employment, whether that's self-employed or for an employer. MAN, 47, SENIOR RELATIONS MANAGER

The percentage of the employable population, so I’m guessing 16 to 65, who are unemployed. MAN, 23, EVENTS MANAGER

Fourth, some respondents emphasised, in various ways, that some people without a job did not count towards the number of unemployed in the unemployment figures, such as those who were not fit to work, did not want to work or were not looking for work. For example:

I would describe it as the percentage of people in the country who are currently unemployed who could be employed. I don’t think you can include people who are not fit for work or can't actually work, so they are not unemployed. WOMAN, 21, STUDENT

Among working age people, how many people are actually in work, and not in work but looking for work. So students are not in it. WOMAN, 34, RECEPTIONIST

Somebody who does not want to work, let’s say, a wife of a very rich man, I don’t think she would go on the unemployment figures, would she, if she doesn’t work? WOMAN, 56, HEALTHCARE DIRECTOR

The number of people actually out of work, who is seeking work. MAN, 55, RETIRED

The percentage of people from the population that could be employed, so not retired or in full-time education, that are not working. MAN, 33, FINANCE SYSTEMS MANAGER

The respondents were also asked how they thought data for the unemployment rate was collected in the UK. All respondents said they were not sure, and emphasised that they did not know, but many provided guesses. Most respondents assumed unemployment data was collected through benefit claimant data, or through National Insurance and tax data. Some examples were:

I'm not sure, but I'm going to presume it's Universal Credit. If I get made redundant, I know I'm going to have to claim Universal Credit. So I guess they take their figures from that. WOMAN, 39, RECEPTIONIST

I would assume there is data from the departments that run the jobcentres and stuff like that would have the data, I suppose. MAN, 40, CIVIL SERVANT

It's collected through government stats, through job centres, through the DWP. That's the only places where they can record it really. WOMAN, 62, RETIRED
I’m guessing that would be how many people are on Jobcentres versus how many people are working. Maybe, they look at National Insurance numbers probably. WOMAN, 29, COMPLAINTS HANDLER

Through some government agency, you know Department of Work and Pensions or something like that? Or maybe through the tax office linked to National Insurance. MAN, 47, SENIOR RELATIONS MANAGER

One respondent said it might be through the census, and the remaining respondents said they did not know.

Finally, respondents were asked whether they knew who collected and published the official data on unemployment. Almost all respondents said they were unsure. Most respondents, however, assumed it was collected and published by a government department. Examples were:

I don’t know, if I had to guess, I would say the government. WOMAN, 21, STUDENT

No, I’m not very sure, but I would imagine it will be somebody to the do with government, obviously, but I don’t know which department. WOMAN, 55, MYSTERY SHOPPER

Department of Employment? I would assume so. MAN, 66, PROPERTY DEVELOPER

I’m not sure, but thinking about it now, I assume it is the Department for Work and Pensions. MAN, 55, RETIRED

Some respondents thought it was the Office for National Statistics (ONS), though they were rarely certain:

Something like the National Institute for Statistics, or National Statistics, something like that. Maybe them, nut I’m not sure. MAN, 47, SENIOR RELATIONS MANAGER

Is it the Office for National Statistics? MAN, 40, CIVIL SERVANT

I imagine it’s a sort of government organisation. Is it the ONS, the Office for National Statistics? And I would say they probably use data from benefit claimants. MAN, 33, FINANCE SYSTEMS MANAGER

Overall, a common misperception among respondents was that unemployment data was collected through benefit claimant and tax data held by government departments, and maybe therefore, they assumed that it was published by government. In reality, the UK unemployment rate is collected through a large household survey called the Labour Force Survey (LFS) with around 37,000 UK households, and published by the Office for National Statistics (ONS), the independent national statistical institute.

The interviewer did not give the answers to these questions prior to showing the communication tools so the experiment reflected how people come across the data in real life. However, it is worth bearing these misperceptions in mind. As we will see, they clearly drove people’s perceptions of data uncertainty related to unemployment. In particular, the common assumption that unemployment figures are collected through benefit claimants data or tax data means people assume unemployment data should be easily and readily available for the whole UK population, without any data uncertainty or significant margin of error. When told in the communication tools that data uncertainty did in fact exist, it was often assumed this would be related to measurement error, such as the inability to capture certain unemployed groups who don’t claim benefits, rather than sampling errors or lack of information.

4.2 Perceptions of unemployment data uncertainty

Public perceptions of unemployment data uncertainty were explored through showing interview respondents a number of communication tools, presenting unemployment figures and data uncertainty in various ways. It was done in the same order for all respondents, and presented below in that order. The broader themes, identified across different communication tools, will be summarised and discussed in Section 5.

4.2.1 Current level of unemployment: numerical point estimate + uncertainty statement (U1)
Interview respondents were first shown a communication tool which provided the most recent UK unemployment figure as an absolute number and in percentage terms, with a sentence about the uncertainty around these figures:

“Official figures by the Office for National Statistics (ONS) for May to July 2020 show that the UK unemployment rate is 4.1%, equivalent to 1.4 million people. There is some uncertainty around this figure: it could be somewhat higher or lower.”

In their initial reactions, almost all respondents reacted to the numerical point estimates themselves, rather than the uncertainty statement. The typical reaction was surprise and sometimes scepticism that the unemployment figures were so low. Some examples were:

I think that’s bullshit. There is absolutely no way only 4.1% of this population is unemployed right now, that is absolutely ludicrous. I can’t say it’s wrong wrong, but I know so many people who have been made redundant. I am on the brink of it myself. WOMAN, 29, COMPLAINTS HANDLER

1.4m, no chance! It’s got to be higher than that, a lot higher! Whoever made this up is having a laugh. I don’t agree with that at all. It’s at least 2-3 million, at least. I think they are kidding themselves. It’s too low. WOMAN, 55, MYSTERY SHOPPER

That’s actually quite low compared to what I thought. I thought it might be a lot more people than that. WOMAN, 34, RECEPTIONIST

Wow, I just thought it would be a lot higher. I hear a lot of politicians saying that unemployment is high, that a lot of people are losing their jobs, so I thought it would be a lot higher. WOMAN, 45, STUDENT NURSE

Some respondents noticed the figures were from May to July and expected it to already have increased a fair amount since then, due to the ongoing impacts of Covid-19. Similarly, other respondents said the unemployment rate would definitely be higher soon, especially as the furlough scheme, officially the Coronavirus Job Retention Scheme, was due to finish within a couple of months at the time of the research interviews.

I would think by the end of the year, it’s going to be significantly higher. As the furloughing scheme winds down, I would expect more people are made redundant. I certainly know more people who have already been made redundant. MAN, 55, RETIRED

It will be interesting to see what happens when the furlough scheme ends. I would expect it to skyrocket, probably to around 8%. MAN, 23, EVENTS MANAGER

Some respondents went on to reassess their own perceptions based on the information:

That’s much better than my figure. I am surprised, but maybe I based mine on poor areas that I know... if it’s been a statistic, it surely must be right. I’ve got no reason not to trust it. WOMAN, 48, NURSERY NURSE

I feel like it should be higher, given 2-3% of unemployment is fairly healthy. Given it is ONS, I would adjust my own thinking, because it is them. They feel like they are reputable and you can trust that figure. MAN, 47, SENIOR RELATIONS MANAGER

A few respondents mentioned the sentence about uncertainty directly in their initial response. They commented this sentence was vague, and felt there needed to be more information:

‘There is some uncertainty around this figure, it could be somewhat higher or lower’, what does that mean? I would kinda like to know why. MAN, 40, CIVIL SERVANT

Where is the uncertainty coming from? Why is there uncertainty? WOMAN, 62, RETIRED

It’s good it says there is some uncertainty, but it would be good to know how much uncertainty. MAN, 47, SENIOR RELATIONS MANAGER

All respondents were then asked directly what they thought about the uncertainty statement. There were a number of typical responses. Many said the statement seemed vague, and they would like more information about how uncertain the figures were:

That is quite vague. When it says somewhat higher or lower, it could be another 10%? MAN 42, SOFTWARE ENGINEER
Somewhat higher, that could be a tiny bit higher. That could be a fraction higher, or it could be quite high. Somewhat higher or lower is neither here nor there, it's very vague. WOMAN, 45, STUDENT NURSE

It's a very ambiguous statement. It feels like it could be anything. How much higher or lower? You have to quantify the range. MAN, 40, CIVIL SERVANT

It's good they say there is some uncertainty, but it would be good to know how much uncertainty. It's good to be honest, but it is dangerous. If you are gonna say there is uncertainty, you have to say how much, you have to qualify it a bit. MAN, 47, SENIOR RELATIONS MANAGER

Some respondents felt the statement was a way of “hedging their bets” or “to cover their backsides”, and others understood why there would be uncertainty and welcomed the acknowledgement that it was not a completely accurate figure:

They are hedging their bets that what they have been given is accurate. WOMAN, 34, RECEPTIONIST

I think it is to cover their backsides. I think it's fairly accurate. The way ONS calculates unemployment is how many people are paying taxes. MAN, 53, CIVIL SERVANT

There could be quite a lot of factors of how difficult it is to get the data, and to get that data right. So I can understand why there would be uncertainty around this figure. MAN, 40, CIVIL SERVANT

I have sometimes thought that it was a very, very accurate guess. I have always thought it cannot be that exact. MAN, 47, SENIOR RELATIONS MANAGER

One of the most common themes was for participants to start wondering why there would be uncertainty in unemployment figures. Due to the common assumption that unemployment data was collected through government data, such as benefit claimant data and National Insurance data, they thought the figures would be readily available and very precise:

I'm not sure why there should be that much uncertainty, give the figures are from May to July. I would have thought the figures from the unemployment claimant system would be in by now. MAN, 55, RETIRED

If this has just been published and the figures are May to July, I would have thought they got the figures right by now. If it is from people signing on to benefits, then I would have thought there was a quite minimal amount of uncertainty. If I am wrong and that's not how they calculate unemployment figures, then there might be a slightly different answer. WOMAN, 56, HEALTHCARE DIRECTOR

I can't imagine it's hard to measure unemployment. No, the DWP know too much about everybody, and I think these figures are made to make it look better. There is too much the government knows about us. They can find out about us through National Insurance. WOMAN, 55, MYSTERY SHOPPER

Some respondents wondered whether the uncertainty was an acknowledgement that it was difficult to capture certain parts of the working and non-working population in the statistics, particularly those “off the radar”, such as those working cash in hand, those who did not claim unemployment benefits, casual workers and people on zero-hours contracts. In statistics terms, they did not entertain the possibility that the uncertainty was related to any sampling errors, but maybe it could be related to measurement error. Examples were:

Maybe because they haven't captured all the data around it? Maybe there could be people who come through the net, that they don't know of, who are unemployed? WOMAN, 45, STUDENT NURSE

There could be people, I know people who have worked for cash in the past, but their jobs have gone now, maybe that's not been published. Maybe, this figure is among those in the books. WOMAN, 48, NURSERY NURSE

Maybe some unemployed people are not registered for benefits, so maybe they are not necessarily on the system. MAN, 55, RETIRED

Because of people who is being counted in it, they are counting casual workers, zero-hours contracts. WOMAN, 64, UNEMPLOYED
Is it because they are not recording, because some people are off the radar? Whole ethnic communities could be totally off the radar? WOMAN, 62, RETIRED

It’s impossible to know exactly because some people don’t sign on, or start to have benefits straightaway when they get unemployed. MAN, 47, SENIOR RELATIONS MANAGER

For this question, and throughout the interviews, it was clear that some respondents accepted that there was considerable amount of uncertainty due to the extraordinary circumstances due to Covid-19 and the lockdown. It was not clear whether those respondents would be inclined to accept uncertainty around unemployment figures in more normal economic times:

Probably because of the virus and Covid, because they are not sure what is occurring. Everything is unstable at the moment. MAN, 63, CARE WORKER

I don’t think it is so accurate, because I don’t think they could have come up with an accurate figure so early into lockdown. WOMAN, 64, UNEMPLOYED

Similar to the GDP communication tools, there were also some respondents who seemed to understand the uncertainty statement as referring to future uncertainty. Typically, they assumed the uncertainty referred to the possibility that these numbers would increase in the future, especially due to the large number of furloughed people who might be made redundant:

There is some uncertainty, because when the furloughing ends, that figure is going to rise substantially. There’s no chance it will be lower than 4%. I mean, there’s so many people that are going to be without a job after the furloughing ends. I think the chance of it rising to 10% is more realistic. MAN, 66, PROPERTY DEVELOPER

When furloughing stops they will probably be unemployed as those companies are going to fold. So the figures are uncertain. They will probably start hike up over the next couple of months. It will probably go up to 2m. MAN, 58, ARTIST

4.2.2 Current level of unemployment: Numerical range, without point estimate (U2)

The respondents were then shown another communication tool that gave a numerical range, both in absolute and percentage terms, without any point estimates:

“Official figures from the Office for National Statistics (ONS) for May to July 2020 show that the UK unemployment rate is between 3.9% and 4.3%, equivalent to between 1.31 million and 1.48 million people.”

Most respondents recognised the difference between U1 and U2, namely that the new statement provided a range rather than a point estimate. However, there was no clear preference between U1 and U2 among respondents. Some respondents thought it was a slightly better way of presenting the figures, and sometimes said it felt more credible and trustworthy to acknowledge the uncertainty up front. Some examples were:

I like it a bit better, because they have said what it will be in-between. WOMAN, 34, RECEPTIONIST

That feels more honest and accurate to me. I would rather know the range than down to a 0.1% guess. I think I would accept it and understand it. On the news, maybe there would be a qualifying sentence that there is based on currently available data or something like that. MAN, 47, SENIOR RELATIONS MANAGER

I think it is very difficult to keep an accurate number of this sort of thing. I suppose you might get some people that might be judgemental that they don’t know it for certain. There will always be a few people who think you should know exactly how many people… It’s not as trust-worthy to give range, but probably more believable with range. WOMAN, 34, RECEPTIONIST

Maybe I would trust it more, nothing is a 100% certain. WOMAN, 48, NURSERY NURSE

It sounds like the same thing, but hedging its bets slightly, rather than committing to an exact figure… It’s probably fairer actually to put it in that sense, rather than giving us the exact figure and then telling us it might not be correct. MAN, 55, RETIRED

In a way you like the figure to be very precise. I do know that sometimes capturing certain data can be problematic, I don’t know if they can give the precise figure. But this is okay, you have an average, that’s fine. WOMAN, 45, STUDENT NURSE
Similarly to the previous communication tool, other respondents were still confused why there would be this uncertainty in unemployment figures:

*What made them come up with this different figure again? They are thinking, they are not sure, no certainty, it's a guess, it's an estimate, just an estimate.* WOMAN, 64, UNEMPLOYED

*The unemployment figures are always reported in the same way. It's always as a percentage of the working population. So, I mean, really, do you need to know anything about them beyond that?* MAN, 66, PROPERTY DEVELOPER

*It's open to interpretation a lot more. Because you have given a range between 3.9% and 4.3%. Politically, people would use the 4.3% if they want a chance of government, whereas 3.9% would suit a lot of other people.* WOMAN, 62, RETIRED

Similar to the previous communication tool, some respondents commented on why this data uncertainty would exist. They guessed it would be due to the current uncertainty in the economy due to the pandemic, and the difficulty in capturing certain unemployment groups in the population. Some examples were:

*I'm not sure where they get the numbers from. I would have thought they got the numbers from the amount of people who get benefits. If people don't claim benefits when they get unemployed, they would not know the exact figure.* MAN 42, SOFTWARE ENGINEER

*They are covering themselves somewhat. But I'm not surprised there is this uncertainty in the figure with the current economic situation.* MAN, 63, CARE WORKER

While this communication tool contained a range of unemployed people between 1.31 million and 1.48 million people (170,000 people), very few respondents noticed the relatively large difference between the lower and upper bound of the range. Only two respondents commented on this. As we will see in the next section, this was in stark contrast to the subsequent communication tool, where the range of 210,000 people were much clearer.

*So that's like 170,000 people the potential difference? That's quite a lot of people, isn't it? How can you not count 170,000 people? If it's done to claimant figures, surely somebody just press a button, there you go.* WOMAN, 56, HEALTHCARE DIRECTOR

*Some people might say, how can you get 100,000s of people wrong. This kinda shows me the kind of range, and that's fine for me, as long as I know there is a general feeling that it is within that range. I think generally people would accept that, I don't know, I could be wrong.* MAN, 40, CIVIL SERVANT

### 4.2.3 Change in the level of unemployment: Numerical range, without point estimate (U3)

The interview respondents were then provided information about the change in the level of UK unemployment during the past year. The first communication tool showed a numerical range without a central point estimate:

*“Official figures from the Office for National Statistics (ONS) for May to July 2020 show that UK unemployment rose by somewhere between 1,000 and 211,000 during the last year.”*

Almost all respondents expressed astonishment and often laughed about the size of the range given in the communication tool. Typical responses were:

*That's quite a wide margin of nothing (1,000) to quite a lot (211,000).* MAN, 23, EVENTS MANAGER

*I find that a bit ridiculous. I would have expected something a bit more precise than that.* WOMAN, 56, HEALTHCARE DIRECTOR, DENSITY STRIP

*It's a rather wide number. What's the point in that? I don't understand.* MAN, 66, PROPERTY DEVELOPER

*There seems to be quite a big variation in that number. Why would there be such a big difference? Or is that not a big difference? Is that just me thinking it is?* WOMAN, 48, NURSERY NURSE

*I think you definitely have to go middle of the road on that one. There is a lot of ambiguity in those figures.* MAN, 40, CIVIL SERVANT
That’s quite a gap. Is there a reason for that? I’m very surprised that it is such a wide gap.
MAN, 63, CARE WORKER

Some respondents made the same point, and argued the wide range made it difficult to assess how the unemployment rate had developed over this period. For instance, this respondent:

There is a big range there. It's hard to get a real understanding of how much the unemployment rate has risen in that period, because of the big range. MAN 42, SOFTWARE ENGINEER

A couple of respondents also feared the statistics would be misused, as it opened up for interpretation, which would enable people to choose the numbers that fit their argument. For instance:

It’s open to interpretation. That increases the risk of figures being misused. I wouldn’t trust this statement. WOMAN, 62, RETIRED

The way that gossip spreads very easily, some people could take the low figure, and some people could take the high figure, and that could spread around to a lot of people saying you know there are only a 1,000 people, or 211,000 people. MAN, 63, CARE WORKER

The Sun and the Daily Mail would probably put it at 211,000 because they saw that number. MAN, 23, EVENTS MANAGER

Some respondents said they did not understand how the figures could not be given more precisely. Sometimes, this made them question the competence of data producers and the accuracy of the figures. Examples were:

That’s a pretty big gap. How can you not know if it is 1,000 or 211,000? You got to have a better approximation? How do they not know? I get they are guessing and making approximations and stuff, but that is huge. It is not between 1,000 and 2,000, at least make it between 200,000 and 211,000. If anything, that makes me think they’re more incompetent than what they actually are. WOMAN, 39, RECEPTIONIST

That seems ridiculous to me, saying it rose between 1,000 and 211,00. That’s such a large range, it just doesn’t seem plausible that they have looked into it probably. It’s almost nonsensical to me…I doesn’t even feel like there’s been any study done. MAN, 47, SENIOR RELATIONS MANAGER

It’s too big a gap to be believable. It sounds like you don’t really know what you are talking about. WOMAN, 34, RECEPTIONIST

I think it would make me more distrustful of the figures, that they can’t give a closer figure of the reality. MAN, 63, CARE WORKER

That’s quite a range. I would imagine it’s nearer the top figure than the bottom figure. It’s a little bit worrying it’s such a wide range. Both figures at the end of that range is quite inaccurate, or potentially quite inaccurate. MAN, 55, RETIRED

This included some respondents who had previously expressed strong trust in the ONS during the interview, but they were now confused why the ONS would not be able to obtain more accurate figures:

But surely they have the actual figures for July? So why would it be between two figures? Are you saying I can’t really trust ONS’ unemployment figures? MAN, 66, PROPERTY DEVELOPER

I would never have been thinking that it could have been 1,000 or 211,000, because it is the ONS. You know, give or take, 5,000 people, but it is a pretty accurate figure. I would take it a bit as gospel. MAN, 47, SENIOR RELATIONS MANAGER

A couple of respondents also expressed some distrust in the government as the presumed producer of the unemployment statistics, as they wondered whether this was a way of concealing the true figures. These respondents had already expressed some degree of distrust in unemployment statistics and the government in previous responses.

That’s a big difference between 1,000 and 211,000. That’s a very big gap. That needs to be a bit more precise… It does seem like they have no idea, they are just putting figures down on paper. They may have a small idea, but they are not sure, they don’t want to give an actual number… Maybe they don’t really want to show the real figures? Because if they show the real figures, then the government will have a big thing on their hands of trying to reduce unemployment. WOMAN, 45, STUDENT NURSE
I don’t think that’s true. I don’t trust the government, I don’t trust anything they say. It’s a big difference between 1,000 and 211,000. They are kidding themselves. We better not let them know that it is thousands and thousands, so we will give them a rough figure. WOMAN, 55, MYSTERY SHOPPER

Finally, some respondents were more inclined to accept the uncertainty statement. Some said this was “official data” and that they trusted the ONS. Others reflected on why this uncertainty would exist. Similar to previously, responses centred on two possibilities: that it could be hard to capture certain groups in the unemployment statistics, and that figures may be uncertain due to the ongoing pandemic and the furlough scheme:

I guess it’s hard to count unemployment, because people have self-employed work, or they don’t bother to say they are unemployed and sign up for benefits. MAN, 23, EVENTS MANAGER

It doesn’t surprise me they can’t give an exact figure, for the time it takes to collect all that information, for everything, the fiscal year, all those different aspects. And the chaos at the moment, and the uncertainty of furlough, that they don’t know at the moment. So they have to be quite wide. But it doesn’t give me a sense that it is that wide when looking at the figures normally. MAN, 58, ARTIST

4.2.4 Change in the level of unemployment: Point estimate + uncertainty statement (U4)

The next communication tool gave the central point estimate (104,000) in addition to an uncertainty statement that this figure could be higher or lower:

“Official figures from the Office for National Statistics (ONS) for May to July 2020 show that UK unemployment rose by 104,000 during the last year. There is some uncertainty around this figure: it could be somewhat higher or lower.”

Especially in the context of the previous communication tool that gave a range between 1,000 and 211,000 people (U3), many respondents preferred this communication tool because it provided a point estimate, even if this was subject to uncertainty:

This makes a little bit more sense. Even if the number isn’t accurate, it at least give you the middle number of that instead of saying, oh, it could be the size of a tiny business with 1,000 people, or 211,000 people. It actually says it is probably a bit higher. MAN, 23, EVENTS MANAGER

It gives you a better understanding of how much unemployment there is. It gives you a much better view on it, even though it is uncertain. I guess that’s more in the ballpark of what’s actually happening. MAN 42, SOFTWARE ENGINEER

Maybe figures like the previous one with such variation might make people think they are just guessing almost, where this one seems more on point. WOMAN, 48, NURSERY NURSE

They are not flying around figures. They are giving a more approximate guess. WOMAN, 55, MYSTERY SHOPPER

Instead of just taking a guess that it is between here and here, we are gonna say we think it is here, but we’re not sure, to cover our backs. But 104,000 is definitely more believable than 1,000. WOMAN, 39, RECEPTIONIST

Some respondents said they preferred the range to the “ballpark figure”, but only if it was a smaller range. Others said they probably preferred the ballpark figure in this communication tool, but their views were affected by having seen how large the uncertainty of this figure was in the previous statement:

If I saw [the point estimate] without having seen the previous information, I would have thought the uncertainty was lower. MAN, 55, RETIRED

It is easier to understand with 104,000, but are they sure it’s 104,000? WOMAN, 64, UNEMPLOYED

It’s a bit more concrete, but when you read it, you still get the same thing, that there is uncertainty. WOMAN, 45, STUDENT NURSE

4.2.5 Change in the level of unemployment: Control, without uncertainty information (U5)
Respondents were then shown a communication tool, with a central point estimate of 104,000 without an uncertainty statement. They were told this was similar to the type of information they would typically see in media stories:

“Official figures from the Office for National Statistics (ONS) for May to July 2020 show that UK unemployment rose by 104,000 during the last year.”

The general consensus among respondents was that this simpler message was better for media stories for the average citizen, and some said they personally preferred this communication tool:

*One figure is what most people need. I like that they took last sentence away.* WOMAN, 34, RECEPTIONIST

*I prefer this one. It seems pretty straightforward. You know that there are 104,000 people more unemployed. How they have written it, there’s no second guessing. They are very precise.* WOMAN, 45, STUDENT NURSE

*I prefer this. You got to have a figure, to base your assumptions on. I would use 104,000, if I was preparing some sort of strategy.* WOMAN, 62, RETIRED

*I liked the disclaimer personally that it could be a bit higher or lower, but this is the ballpark we are working with. However, if it is going out to the media, seeing that one number is more than enough. You get an idea of how things are moving or progressing.* MAN 42, SOFTWARE ENGINEER

*The less information, the better. We’re bombarded with too much information that we can’t process it because we’re trying to just get out heads around all these figures that then become meaningless in some ways.* MAN, 58, ARTIST

Some respondents noted that this standard communication was very “exact”, “bang on” and “categorical” about the figure:

*That’s quite understandable. But it doesn’t say…. it’s quite categorical on the number.* MAN, 66, PROPERTY DEVELOPER

*It makes it sounds like an exact figure, but it sounds more truthful, I think.* WOMAN, 55, MYSTERY SHOPPER

*I read that and I believe that whoever has done their homework or research into this, they’ve got it bang on. This makes it seem like, that’s what it is, not it could be more, it could be less. It makes them look more competent.* WOMAN, 39, RECEPTIONIST

These respondents reflected back on the previous information about the uncertainty around the unemployment figures. Knowing this information, they now wondered whether it was misleading to present these figures without acknowledging the uncertainty.

**4.2.6 Change in the level of unemployment: Numerical point + sample uncertainty (U6)**

The final communication tool gave the central point estimate of 104,000, in addition to a very brief description that these statistics are estimates based on samples:

“Official figures from the Office for National Statistics (ONS) for May to July 2020 show that UK unemployment rose by 104,000 during the last year. The data comes from surveys of households. It is not possible to survey every household each month, so these statistics are estimates based on samples.”

Respondents were generally interested in this information, especially as they did not know the unemployment rate was calculated this way. Some respondents also liked that the communication tool described why the uncertainty existed, rather than just saying it did:

*I must admit I did not know the figures were achieved that way.* MAN, 55, RETIRED

*It’s really interesting to find out. They can’t ask everyone. It makes sense it has to be a sample.* MAN, 53, CIVIL SERVANT

*I’m happy with that, because it is not possible to survey every household each month. That’s how things have been analysed for decades… [The survey] will capture a lot more who are off the radar… I like when it is described why the uncertainty is there, rather than just saying it is.* WOMAN, 62, RETIRED
I’ve never seen one of those surveys myself. I guess it takes a snapshot of a certain region or population and compare the results. That is surprising it is done in that way. MAN 42, SOFTWARE ENGINEER

The most typical response was to ask the interviewer for more detailed information. This was given to participants, including that the household survey was done with around 37,000 households every quarter. However, it was common that the additional information generated even more questions. For instance, some respondents felt 37,000 households was a small sample, and wondered why this had been chosen as the sample size:

I have always thought, even if you do a huge survey of a population of 60m people, to do a survey of 100,000 people, it feels like there is quite a big range of error, to base everything around that survey. I would have thought there might be better ways to do it. There must be ways to do it, with IT, tax payments etc. MAN, 47, SENIOR RELATIONS MANAGER

It is a difficult thing to count up really, so I can appreciate why they have done it that way. Is the [sample size] restricted by how much resources they have? MAN, 40, CIVIL SERVANT

How many do they survey? 37,000 households? It’s a very small percentage of UK households, isn’t it? If there any sort of algorithm to how these 37,000 are selected, or are they just sort of random? Are they A to Ds? Or is it just C to Ds? I don’t think I will treat the unemployment figures with quite the same respect as before. I mean, I would have thought the sample would have been much higher. MAN, 66, PROPERTY DEVELOPER

What’s the reason they survey 37,000 households? What’s the reason for that exact figure? MAN, 63, CARE WORKER

One respondent also wondered whether people would fill out the survey correctly, giving the example of someone without a job who was not looking for work. She thought this person should be counted as unemployed, but doubted the person would classify themselves as such. This respondent was given further information afterwards, in particular that the questionnaire data is collected face-to-face using computer-assisted questionnaires, or completed over the telephone.

If somebody was filling in a survey at home, if you take a rich husband and rich wife by default [who is not working], I’m not sure she would cast herself as unemployed. WOMAN, 56, HEALTHCARE DIRECTOR

5 Discussion and Conclusion

A number of themes were identified during the interviews. Most importantly, it is clear that many respondents understood the information about uncertainty to some extent, both in relation to GDP growth and unemployment estimates. This might not always have amounted to a detailed or complex understanding, and people may not always have used the specific quantifications for that uncertainty in their thoughts about the accuracy of the economic data, but nevertheless it is likely to have affected their thinking about the numbers, especially the broader acknowledgement that there is some margin of error around the estimates. Of course, this paper cannot draw any causal findings, due to its design and sample sizes. But it provides nuanced data and insights which can help explain the findings of recent randomised controlled experiments (Galvao & Mitchell, 2021; van der Bles et al. 2020). These papers have indeed shown that such communication tools can improve perceptions of uncertainty, and find little evidence of undermining trust in the data.

In addition, this paper provided qualitative data about how people are likely to think about data uncertainty around economic estimates, and how this differs between GDP growth and the unemployment rate. A major theme was that respondents sometimes misunderstood what type of uncertainty was referred to in the communication tools. Many respondents simply understood uncertainty to be about future uncertainty or forecasting uncertainty, in the sense that economic numbers would change as economic events unfolded. Some respondents found it more difficult to understand why uncertainty would exist in relation to economic data for time periods in the past, and it is clear that communication tools need to be careful about this distinction. The Covid pandemic made this more intuitive for many respondents, as they reasoned workplaces might have been closed and economic data could have been hard to come by, but it is unclear to what extent they thought this was the case under normal circumstances.
Generally, it seemed easier for respondents to conceptualise uncertainty around GDP estimates than unemployment figures. Respondents had less pre-conceived ideas about how GDP data was collected, and maybe as a result, they were more open to accept uncertainty, or indeed any other statements made about GDP. On the flipside, they were also often much less interested in it, and sometimes said they just wanted a single figure without any caveats. In contrast, respondents had pre-conceived ideas about how unemployment figures were collected. Many wrongly assumed that unemployment figures were based on benefit claimant or tax data that were readily available for the whole UK population. This led many respondents to question why there would be uncertainty at all around the figures, and especially why the margin of error would be so large. Respondents often assumed it would be related to measurement error, such as the inability to capture certain unemployment groups who don’t claim benefits, but never related it to potential sampling errors.

The last communication tool therefore communicated the specific reasons for the uncertainty around unemployment figures, namely that unemployment figures are collected through a finite sample of households rather than the whole population. This information, however, opened up a range of questions among respondents about how unemployment is collected. People were clearly very interested in this information as it challenged common assumptions. For an economic figure like unemployment, where the UK public have many strongly held views and assumptions, it is therefore unlikely that a fairly light-touch description of the methodology and sampling uncertainty would suffice.

Generally, unemployment was, unsurprisingly, more salient to respondents than GDP growth figures. Respondents were typically more interested in the unemployment figures which they found more relatable, and they felt more confident and comfortable in evaluating the numbers, including the degree of uncertainty around them. This was very evident in respondents’ first reactions to the figures. For GDP figures, respondents generally reacted to the GDP growth numbers themselves (which they found interesting due to Covid) but they ignored the uncertainty information. Even when prompted about the uncertainty information, respondents rarely made any additional points about the existence or size of this uncertainty. However, for unemployment figures, respondents reacted immediately to the uncertainty information, and engaged fully with this information. Often, however, respondents questioned why this uncertainty existed, and especially why the margins of error were so substantial in their view. Some felt the statements were a way of “hedging their bets” or “to cover their backsides”, while others welcomed the acknowledgement that it was not a completely accurate figure. For both economic concepts, respondents tended to use their own experiences and own information about the economy to assess the accuracy of the figures, including whether they thought it was likely to be revised and by how much. However, even if they were not directly referencing the uncertainty information provided in the communication tool, it might still have affected their thoughts, which indeed is suggested by the findings in previous evaluations of the communication tools (Galvao & Mitchell, 2021; van der Bles et al. 2020).

Finally, some respondents feared the unemployment figures could be misused if they were presented in this way, as it opened up for a large degree of interpretation, enabling people to choose the numbers that fit their argument. Some respondents felt it may support the view that statistics could be used to tell any story. This led to some concern among a few respondents that the unemployment numbers could no longer be trusted, and it made them question the competency of the data producers. However, the small sample size and the sampling method means this paper cannot draw any conclusions on this but it suggests that statistics producers should be more cautious about communicating uncertainty in unemployment figures. It seems likely that unemployment figures, compared to GDP growth figures and possibly also other economic statistics, are more sensitive to questions about their accuracy, especially when uncertainty is largely at odds with the common public assumption that unemployment data is collected through readily available benefit claimant or tax data, which should give an accurate figure.

6 References


## Appendix A: Sample characteristics

**Table 1. Characteristics of the interview sample**

<table>
<thead>
<tr>
<th>Characteristic / demographic</th>
<th>Number of respondents</th>
<th>Proportion of respondents</th>
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Table 2. Individual participants in the interview sample

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Appendix B: Discussion Guide

Introductions and background

- Introduce yourself – stress role as independent research organisation, NIESR.
- Thank you for agreeing to talk with us. This interview is part of a research project for the Economic Statistics Centre of Excellence (ESCoE). The project is about the economy, ways of presenting economic statistics to the public, and so on. What we are interested in is your understanding, your views and your experiences. Our aim is to inform how to improve communication of economic issues to the public.
- With your permission, interviews will be recorded so that I can listen back and ensure I haven’t missed anything you have said. All the information you provide will be treated in the strictest confidence. Anonymised data will be analysed and presented so you will not be identifiable in any reports or publications resulting from this research. Your participation is voluntary so you are free to withdraw from the interview at any stage without giving a reason. As you know, you will be given £30 as a bank transfer after the interview.
  - Please can you confirm you are happy for this interview to be audio recorded?
  - Please can you confirm that you are willing to take part in this research?
- Do you have any questions before we start the interview?

About participant and warm-up exercises to get talking about economy/economics

- Can you briefly tell me about yourself: your age, living situation, and where you live? What’s your educational qualifications and what is your current job?
- How interested would you say you are in the economy and economic issues? [Probe for any areas particularly interested in]
- To what extent do you read, watch or listen to news about the economy? How often? What sources do you use?
- Have you ever studied economics, at school, in higher education or through self-directed study, e.g. books, courses?

To get started talking about the economy and economics, I want to ask you a few brief questions about your understanding of different economic terms.

- How would you describe what the unemployment rate is?
  - Do you know how data is collected and how it is calculated?
  - Do you know who publishes data on the unemployment rate?
- How would you describe what the inflation rate is?
  - Do you know how data is collected and how it is calculated?
  - Do you know who published data on the inflation rate?

Definition questions about ONS and GDP

- How would you describe what the Office for National Statistics (ONS) is, and what they do?
  - To what extent do you trust the economic statistics produced by the ONS, for example unemployment, inflation and economic growth, and why?

[Give participants following definition like in survey: The Office for National Statistics (ONS) is the UK’s largest independent producer of official statistics and the recognised national statistical institute of the UK.]

- How would you describe what GDP is?
- [Give survey question by sharing screen from Galvao & Mitchell (2021): To the best of your knowledge, which option most accurately describes what GDP is? Answer options: GDP measures the increase in prices; GDP measures how many people are in employment; GDP measures the size of the economy; GDP measures the difference between exports and imports; I don’t have a clue what GDP is; I have heard about GDP but not sure what it is].

[Give participants the following definition like in survey – shown on the screen: Gross Domestic Product (GDP) is the total value of goods and service produced in the UK. When GDP goes up, the economy is growing – people are spending more, businesses may be expanding. This is called GDP growth, and it is a key measure of the economy’s]
When GDP goes down, the economy is contracting and GDP growth is negative – people are spending less, businesses may be closing.

Questions about GDP uncertainty

Okay, let’s move on to the next section. The Office for National Statistics (ONS) publishes estimates of GDP growth. I will now show you their latest estimates of GDP growth by sharing my screen, and then I will ask you a number of questions afterwards.

• What’s your initial reactions to this?
• Do you understand what it shows? What are the main points? [probe]
• How accurate do you think the minus 21.7% estimate of GDP growth is?
• Would you be surprised if GDP fell by more than 21.7%? How much more?
• Would you be surprised if GDP fell by less than 21.7%? How much less?
• What do you think is the chance that GDP fell by exactly 21.7%? [shown on screen, with answer options]
• What do you think is the chance that GDP fell by between 21.4% and 22.0%? [shown on screen, with answer options]

Questions about ONS revisions to GDP estimates

• In fact, ONS regularly publishes revisions to their GDP estimates. Why do you think they do this? [potentially probe: mistakes at ONS; more information becomes available; ONS has vested interests in results/manipulates production or collection; government has vested interests in the results/interferes in production or collection; limitations to the way GDP is measured]
• Are you surprised that estimates of GDP growth are regularly revised? Have you ever thought about this before?
• Thinking back to the statement I showed you on the screen about GDP growth, how much information would you say it gave that their estimates may be uncertain?

Questions about other treatments

• What’s your initial reactions to this?
• Do you understand what it shows? What are the main points? [probe]
• Overall, which statement do you think is best? Why?
• Which statement do you think is better at showing to you that the GDP estimate is uncertain? Why?

Questions about unemployment uncertainty

• What’s your initial reactions to this?
• Do you understand what it shows? What are the main points? [probe]

Thanks and close