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Staff Working Paper No. 750
Enhancing central bank communications with behavioural insights
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Abstract

In this joint Bank of England and Behavioural Insights Team study, we test the effectiveness of different approaches to central bank communications. Using an online experiment with a representative sample of the UK population, we measure how changes to the Bank of England's summaries of the *Inflation Report* impact comprehension and trust in its policy messages. We find that the recently introduced Visual Summary of the *Inflation Report* improves comprehension of its main messages in a statistically significant way compared to the traditional executive summary. We also find that public comprehension and trust can be further improved by making the Visual Summary more relatable to people's lives. Our findings thus shed light on how central banks can improve communication with the public at a time when trust in public institutions has fallen, while the responsibilities delegated to central banks have increased.

Key words: Central bank communications, central bank legitimacy, experimental economics, behavioural economics, Bank of England Vision 2020.

JEL classification: A12, A13, A29, C21, C83, C90, C91, C93, D83, D91, E52, E58, E70, G41, M38.

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SECTION 1: BACKGROUND

Before a Parliamentary inquiry in the 1930s, Sir Stephen Harvey, the then Deputy Governor of the Bank of England, summed up the Bank's approach to external communications by saying that it was "to leave our actions to explain our policy," adding that "it is a dangerous thing to start to give reasons."[1]

While reflecting the orthodoxy of his day, Harvey's view about the approach which central banks should take in their communications with the public stands in sharp contrast to the present day. Over time, central banks have moved from a position of "never explaining" their policy to a position where, increasingly, "the explanation *is* the policy", as former Fed Chair Janet Yellen (2013) once quipped. For example, following the financial crisis, many central banks, including the Bank of England, started to publicly state their intentions about the future path of interest rates, a policy known as 'forward guidance.' More generally, while a century ago the Bank issued just one speech per year, in 2016 alone it issued 80 speeches, 62 working papers, close to 200 consultation documents, just under 100 blogs and over 100 statistical releases— in total, over 600 publications (Haldane 2017a).

However, the increasing amount of communications from the Bank of England has not always meant an increase in their accessibility to the general public. For example, Fullwood (2016) found that recent speeches and reports from the Bank on average require a reader to have the literacy level of a university graduate.

One of the reasons central bank publications are often challenging to read relates to the technical nature of the subject matter— economics. A YouGov poll conducted in 2015 found that only 12% of respondents said politicians and the media discussed economics in an accessible way (Earle, Moran and Ward-Perkins 2017). This suggests economic information is challenging to communicate irrespective of who is communicating it. Unclear communication of economic information may also go some way to explaining the low levels of public trust in economists. Another YouGov poll conducted in 2017 found that only 25% of the UK population trust economists, compared to 71% who trust scientists (Smith 2017).

These sorts of statistics have led the Bank of England's Chief Economist Andy Haldane (2017b) to diagnose economics with a "twin deficit" problem, comprising an "understanding deficit" and a "trust deficit." The two deficits are interconnected. Recent empirical research has shown that satisfaction with the Bank of England's policies increases with a better understanding of their empirical basis (Jost 2017).

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[1] Harvey as quoted on p. 373 in Kynaston (2017). Harvey's views were representative of the Bank's historic approach to communicating with the public. For example, in 1962, another Deputy Governor, Humphrey Mynors, along with one of the Bank's economic advisers at the time, Maurice Allen, assembled a list of propositions titled "Opinions Attributed to Central Bankers," with one of these opinions being "Central bankers should always do what they say and never say what they do." Humphrey Mynors and Maurice Allen as quoted on p. 477 in Kynaston (2017).

For this and other reasons, the Bank of England is enhancing how it communicates economic information by making changes to its publications in order to make them easier to read. Central to this strategy is layering Bank publications, with each layer addressing a different target audience. For example, in November 2017, the Bank launched a new three-layered *Inflation Report*. The first layer consists of an announcement of the interest rate decision alongside icons explaining the decision in an abbreviated format that can be shared via social media. The second layer is a Visual Summary of the *Inflation Report* consisting of a more in-depth but still brief overview of the main factors behind the Monetary Policy Committee's (MPC) interest rate decision. The Visual Summary is written in plain English and is accompanied by visually engaging icons and charts. Finally, the third layer consists of the full *Inflation Report* including an executive summary (the 'Monetary Policy Summary') written in more technical language and unaccompanied by icons. Other central banks are similarly looking to address the same issue. For example, in a speech about central bank communications being a monetary policy tool itself, Mario Draghi (2014) announced that the European Central Bank would be publishing summaries of monetary policy meetings, and testing various formats to identify which of these are most widely understood by the general public.

In this joint study conducted by researchers at the Bank of England and the Behavioural Insights Team (BIT), we investigate the impact the Bank's enhanced approach to communications has on public trust and understanding. We conducted our investigation through an online experiment with a representative sample of the UK population. Specifically, our investigation sheds light on the extent to which the new Visual Summary improves public comprehension and trust in key messages from the Bank's *Inflation Report* compared to the traditional Monetary Policy Summary. We also test both of these formats against further simplified and more relatable summaries that we designed, based on insights from behavioural science.

Our key finding is that both the Visual Summary, and further simplified and relatable versions of it, improved public understanding of Bank messages compared to the traditional Monetary Policy Summary. In addition, the simplified and relatable versions of the summaries applying behavioural insights further improved public understanding of Bank messages compared to the Visual Summary. These results provide tangible suggestions for the Bank of England, and other central banks and financial regulators, to improve their public communications.

Our paper contributes to the growing literature examining central bank communications. Much of this literature looks at central bank communications on their own terms, describing the style, sentiment and subject matter of central bank pronouncements (Jansen and De Haan 2010; Apel and Grimaldi 2012; Allard et al. 2013; Holmes 2013; Schonhardt-Bailey 2013; Siklos 2013; Hansen, McMahon and Prat 2014; Bholat et al. 2017). To the extent that this literature looks at the impact of central bank communications, it typically does so by attending to how these communications influence movements in financial markets (Gürkaynak, Sack and Swanson 2005; Blinder 2009; Hendry and Madeley 2010; Bulir, Cihak and Jansen 2014; Montes et al. 2015; Ehrmann and Talmi 2017). Fewer studies look at the impact of central bank communications on the general public. Those that do tend to focus on households' and firms' inflation expectations. For example, Binder (2017) finds that household inflation expectations are generally "weakly anchored", that is, they do not fully reflect central banks' stated inflation targets.

Better communication and increased transparency may improve the effectiveness of central bank policies (Kohn 2011). However, more is at stake today in central bank communications with the public than just anchoring household and firms' inflation expectations to inflation targets, important and difficult as that task remains (Kumar et al. 2015). As argued by Haldane and McMahon (2018), effective central bank communications that enhance public comprehension and trust are "important for reasons of political accountability, ensuring operationally independent central banks are meeting the terms of their social contract with wider society." Our study thus widens the typically narrow focus of the literature on the link between central bank communications and economic outcomes to focus as well on understanding how different ways of communicating influence public understanding of, and trust in, the Bank of England's policy messages. This is an especially pertinent research angle to take at present when public understanding and trust in established institutions appears to have declined, while the responsibilities delegated to central banks have increased since the financial crisis (Goodhart and Lastra 2017; Shafik 2017; Edelman 2018; Tucker 2018).

Our study also makes a contribution by applying experimental methods to macroeconomic policy questions. In both the social and natural sciences, experiments are often considered a 'gold standard' methodologically because they allow researchers to isolate the effect of variables that are confounded by external factors when data is collected in the real world. Experiments thus provide a stronger basis for inferring a causal relationship between variables and can help researchers avoid drawing spurious correlations. Even so, experiments are still relatively uncommon in economics in part because real-world economic relationships are difficult to recreate in a laboratory setting. They are rarer still in applied central banking and financial regulation research, though there are some recent, notable exceptions, to which we add another (Financial Conduct Authority 2014; Iscenko et al. 2014; Armentier et al. 2015; Smart 2016; Harris et al. 2017; Glazebrook, Larkin and Costa 2017; Money Advice Service, Behavioural Insights Team and Ipsos Mori 2018).

The closest analogue to our paper is recent research conducted by Haldane and McMahon (2018). They surveyed 285 members of the general public and, separately, a convenience sample of first-year graduate students in the Oxford economics department. Survey respondents were randomly assigned to read either the Monetary Policy Summary or the Visual Summary, both published in November 2017. Respondents were then asked to assess whether they thought the content was understandable, and how reading the summaries had changed their outlook on the UK economy. They were also asked how, if at all, their perceptions of the Bank of England had changed after reading the summaries. Both members of the general public and economics students reported that the Visual Summary was easier to understand. While reading the Visual Summary improved economics students' reported perceptions of the Bank, this was not the case with members of the general public. Conversely, members of the general public reported changing their outlook for the UK economy in a way that meant their views became more closely aligned with the Bank's, while there was no such statistically significant effect on economics students.

Our research builds on their work in several ways. First, we have increased the sample size to more than 2,000 participants, and ensured that it is representative of the UK population in terms of age, gender, income and regional location. This increases the robustness of the results because it gives us more statistical power to evaluate the causal impact of the additional interventions on measures of comprehension and trust. Second, our main analysis is based on tests that measure comprehension

directly, rather than self-reported measures of comprehension. This is useful because the validity of self-reported measures is open to challenge as there is no independent way to objectively verify the actual comprehension of experimental participants. Previous studies measuring both self-reported and actual comprehension have found that participants frequently overestimate their understanding (Galizzi and Navarro-Martínez 2017) and that the two may be poorly correlated (Loewenstein et al. 2013). Finally, in addition to testing the Monetary Policy Summary and the Visual Summary, we also test two new summaries of the *Inflation Report* that further simplify the pitch of economic information, and make the information more relatable. In this way, we aim to provide some suggestions for how central banks could structure their communications by testing additional techniques for communicating economic information.

The two new summaries of the *Inflation Report* tested in this experiment were designed drawing on insights from the behavioural economics and finance literatures. This literature has documented how informational complexity can lead consumers to make sub-optimal choices. For example, consumers can experience 'choice overload' when facing complex products, which can cause them to either choose inferior options, or disengage from making a decision altogether (Chernev, Böckenholt and Goodman 2015). Similarly, some studies have found that complex tax systems can cause individuals to ignore information on newly introduced taxes (Abeler and Jäger 2015) and can negatively impact labour participation decisions (Feldman, Katuščák and Kawano 2016). Such complexity may disproportionally affect individuals with low numeracy and income levels (Taubinsky and Rees-Jones 2016).

In this research, we test whether reducing the amount of information in the Bank's *Inflation Report* summary improves comprehension and trust. In so doing, we both draw on the behavioural finance literature which has found that reducing the information which individuals need to process improves their engagement (Perry and Blumenthal 2012; Ben-Shahar and Schneider 2014; Glazebrook, Larkin and Costa 2017), and develop this literature in a new direction by focusing on macroeconomic understanding, rather than microeconomic decisions. Our study also explores whether other strategies beyond simply reducing information can improve comprehension and trust. In particular, we test whether making the material more relatable to people's daily lives improves comprehension and trust. For example, previous studies have found that making information relevant to individual circumstances can increase engagement (Garner 2005; Behavioural Insights Team 2012), and that expressing financial costs in pound values instead of percentages can improve comprehension (Gigerenzer and Edwards 2003; Spiegelhalter 2017).

The rest of the paper proceeds as follows. The next section details our experimental research design, including the materials we used in each condition, how participants were sampled, and the analytical approach we took with the data we generated. We then report our findings. Finally, we conclude by placing our findings in the wider context of the Bank's recent efforts to enhance its communications. We also chart a path for future research in this area.

SECTION 2: METHODOLOGY

I INTERVENTIONS

The purpose of our experimental study was to test and measure the way changes in the format of the Bank's summary of the *Inflation Report* change comprehension of, and trust in, the Bank's policy messages. Our experiment consisted of four conditions: one control condition and three treatment groups.

Monetary Policy Summary: Our control condition was the Monetary Policy Summary from the February 2018 *Inflation Report*. This is the summary that typically receives the most website traffic. For example, the February 2018 Monetary Policy Summary had 40% more page views than the February 2018 Visual Summary.

Visual Summary: The first treatment group received the Visual Summary published in February 2018.[2] The Visual Summary uses simpler language than the Monetary Policy Summary. While the February 2018 Monetary Policy Summary required the literacy level of a university student according to the Flesch-Kincaid readability metric[3], the Visual Summary required a level attained by an average 13 to 14 year old.

Reduced Text Summary: The second treatment group received a reduced text version of the Visual Summary. Although the February 2018 Visual Summary was written in simpler terms than the Monetary Policy Summary, it was actually longer. For this reason, we wanted to test whether reducing text as a strategy on its own improved public comprehension and trust of the Bank's policy messages. Thus this condition had half the number of words that the published Visual Summary had (Table 1).

Relatable Summary: This condition tried to make the key messages from the *Inflation Report* more relatable to a wider audience. Our relatability condition had various components. First, it featured linguistic 'involvement' (Biber 1991), which meant increasing the use of first and second person pronouns (e.g. 'us'/'you') while reducing the use of third-person abstractions (e.g. 'the Bank of England'). For example, you/your accounted for 6.6% of all words in this condition but were totally

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[2] The Monetary Policy Summary and the Visual Summary used in this experiment are available for viewing on the Bank's website. See Annex 1 for the Reduced and Relatable summaries.

[3] Readability indices in Table 1 are calculated using the formulae below. Lower scores mean the text is more accessible to a wider population.

Flesch-Kincaid reading grade level: $0.39 \left(\frac{\text{number of words}}{\text{number of sentences}} \right) + 11.8 \left(\frac{\text{number of syllables}}{\text{number of words}} \right) - 15.59$

Automated readability index (ARI): $4.71 \left(\frac{\text{number of characters}}{\text{number of words}} \right) + 0.5 \left(\frac{\text{number of words}}{\text{number of sentences}} \right) - 21.43$

SMOG index: $1.0430 \times \sqrt{\left(\frac{\text{number of polysyllables} \times 30}{\text{number of sentences}} \right)} + 3.1291$

Gunning Fog index: $0.4 \left[\left(\frac{\text{number of words}}{\text{number of sentences}} \right) + 100 \left(\frac{\text{number of polysyllabic words}}{\text{number of words}} \right) \right]$

absent from the Monetary Policy Summary. Second, we used day-to-day words such as 'rising prices' in place of more technical ones such as 'inflation.' The third component of our relatability strategy was visual personalisation. In February 2018, only around 10% of viewers of the Visual Summary took the time to expand the charts embedded in it. We replaced static charts on macroeconomic variables in the Visual Summary, with an interactive chart that invited participants to find out what unemployment was like in the region in which they reside. Finally, taking a cue from Shiller (2017), we increased the narrative coherence between different sections of the summary by explaining the Monetary Policy Committee's interest rate decision with reference to prices, pay and jobs, topics which previous focus group research conducted by the Bank had identified as resonating most with people. Thus the narrative redraft put the Bank's policy messages in the context of people's daily lives, for instance, by explaining what the recent fall in the value of the pound meant for the price of holidays abroad, and translating the impact of a 2% inflation rate for the rise in price of a £100 basket of goods and services.[4]

Table 1: The word count and readability of different experimental conditions

Condition	Word count	Flesch-Kincaid grade level	Automated readability index	Gunning Fog index	SMOG index
Monetary Policy Summary	879	15.26	15.97	18.98	16.65
Visual Summary	1069	7.34	6.40	9.67	9.94
Reduced Text Summary	535	6.18	4.98	8.50	9.19
Relatable Summary	407	4.98	3.87	7.35	8.00

II   EXPERIMENTAL STAGES

Our experiment was conducted using the Behavioural Insight Team's online experimentation platform Predictiv.[5] Participants were randomly assigned to read one of four versions of the *Inflation Report* summary. There was no time limit for reading either the summaries or for answering the questions. The median time participants spent reading the summaries was 1 minute 12 seconds.

Afterwards, participants went through a series of stages (see Figure 1):

- **Self-reported comprehension question:** We asked participants to tell us how much of the summary they felt they understood.

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[4] While the main aim of this condition was to make it easier for people to relate to the information provided, these changes also simplified the material, as reflected in a further reduction of the Flesch-Kincaid grade level for this condition.

[5] Predictiv (www.predictiv.co.uk) is an online platform for running behavioural experiments. It enables governments and other organisations to run randomised controlled trials (RCTs) with an online population of participants, and to test whether new policies and interventions work before they are deployed in the real world.

- **Direct comprehension questions:** These five questions formed the primary focus of our analysis. They were designed to test whether readers understood the key policy messages contained in the *Inflation Report* summaries, such as the remit of the Bank's Monetary Policy Committee, and their interest rate decision. The full list of questions is in Table 2.
- **Applied comprehension questions:** We asked participants two questions about the impact of price rises (discussed in all the summaries) on grocery expenditure and salaries, respectively. The purpose of these questions was to understand whether participants could apply the information contained within the *Inflation Report* summaries to decisions they might make in their lives outside the confines of the experiment.
- **Trust questions:** We asked participants a question about their perception of the Bank after having read the summaries. We also asked a question about how much they trusted information from the website. As a corollary of this second question, there followed a free text question asking participants why they gave the website the rating that they did.
- **Participant profile questions:** The final stage of the experiment asked respondents how frequently they read economic or business news, and if they had ever studied economics, finance or a related field. All Predictiv participants are automatically profiled on gender, age, income, and regional location, so this information was not solicited again in the experiment.

Given the parallels between our study and recent research by Haldane and McMahon (2018), we included two of the same measures used in their paper to compare our results with theirs. The first is the same self-reported comprehension question. However, self-reported understanding can differ from tested understanding, and the latter more closely corresponds with actual behaviour (Loewenstein et al. 2013); hence why we complemented the self-reported question with a series of direct comprehension questions. We also reused a question they asked about the impact different summaries had on perceptions of the Bank. Since perceptions of the institution are an imperfect proxy for trust in the information, we also asked about trust directly.

Figure 1: Stages in the experiment
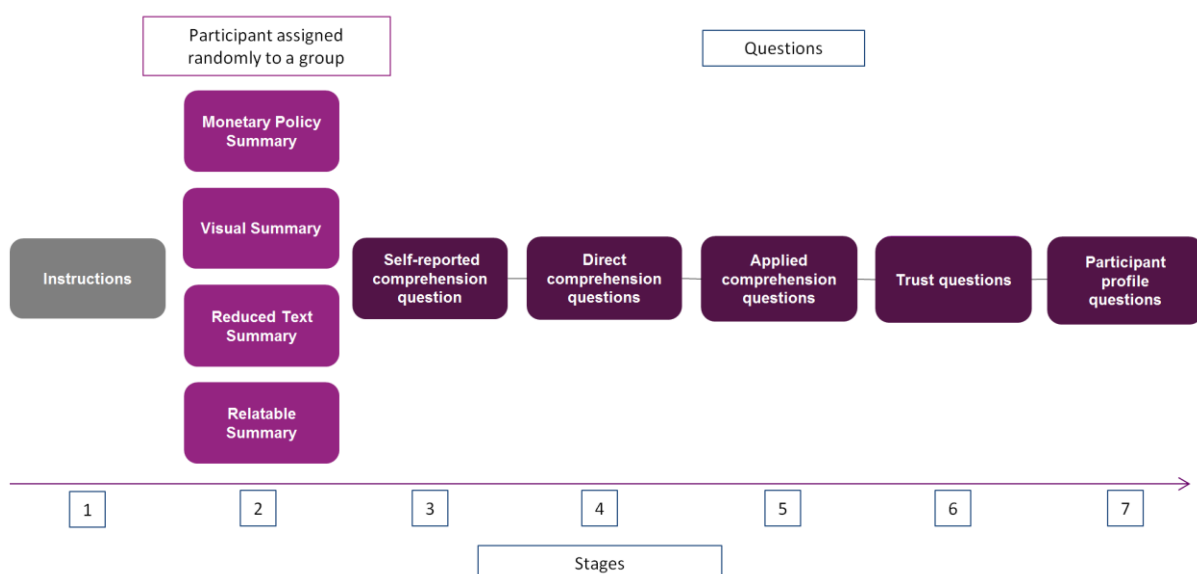
Table 2: Experimental questions

<table>
<tr><td>

Questions asked of participants
Correct answers are underlined, where applicable

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Self-reported comprehension

1. *To what extent are you able to understand the content and messages of the material you just read?*

      a. None or nearly none of it
      b A small amount of it
      c. About half of it
      d. A lot of it
      e. All or nearly of it

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Direct comprehension questions

1. *In what way does the Bank of England support the UK economy?*

      a. <u>The Bank tries to keep changes in prices of goods to 2% per year</u>
      b. The Bank tries to keep prices of goods as low as possible
      c. The Bank tries to make sure that prices of goods don't change
      d. The Bank is currently trying to keep changes to prices of goods to 0.5% per year

2. *Based on what you have read, which of these is true about prices at the moment?*

      a. Prices are falling
      b. Prices aren't changing
      c. Prices are rising, but more slowly than the Bank's target
      d. <u>Prices are rising faster than the Bank's target</u>

3. *Based on what you have read, what has happened to the amount of people that are out of work recently?*

      a. <u>The number of people out of work has decreased</u>
      b. The number of people out of work is about the same
      c. The number of people out of work has increased
      d. Don't know

4. *Based on what you have read, what is likely to happen to how much people can afford to buy this year?*

      a**.** People will be able to afford less as pay will rise more slowly than prices
      b. People will be able to afford less as pay will fall and prices will rise
      c. <u>People will be able to afford more as pay will rise faster than prices</u>
      d. People will be able to afford more as pay will stay the same and prices will fall
      e. There will be no change in what people can afford

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5. *What is the Bank of England's current interest rate?*

   0.5%. [*Participants had to move a sliding scale ranging from -1% on the left-hand side to 2% on the right-hand side. The slider had no default position and could be moved at increments of 0.1%*]

Applied comprehension questions

1. *Your friend spends £100 a week on groceries. They are planning their household finances for next year, and are thinking about how much they need to budget for groceries. They want to keep buying the same things as they are now.*

   Based on what you have read, what do you think they should budget for their weekly grocery shop next year? What your friend spends each week on groceries now: £ 100

   What your friend should budget for their weekly grocery spend next year: £102-103
   Range of correct free text responses

2. *Your friend earns £100 per day. They will have a chance to ask for a pay rise at the end of this year to cover increases in the cost of living.*

   Based on what you have read, how much should they ask for, just to cover increases in the cost of living? Your friend's daily rate (what your friend currently earns): £100 per day

   What your friend's daily rate should be next year to cover increases in the cost of living: £102-103 per day *Range of correct free text responses*

Trust questions

1. *Learning that this is typical communication in the Bank of England quarterly Inflation Report, how has the Inflation Report summary affected your perceptions of the Bank of England, if at all?*

   a. Worsened significantly
   b. Worsened slightly
   c. About the same
   d. Improved slightly
   e. Improved significantly

2. *Imagine someone is looking for trustworthy information about the economy. How would you rate the information on the website you have just seen? Please use the scale below for your answer, where 0 means 'distrust completely' and 10 means 'trust completely.'*

   Participants had to move a sliding scale ranging from 0 on the left-hand side to 10 on the right-hand side. The slider had no default position and could be moved at integer increments.

3. *Just now you rated the information on the website you have seen. Please tell us why you chose the way you did.*

   Free text response

Participant profile questions

1. *How often do you read or visit a website for economic or business news?*

    a. Every day
    b. About once a week
    c. About once a month
    d. Never or hardly ever

2. *Have you ever studied economics, finance or similar subject?*

    a. Yes
    b. No

III   SAMPLING STRATEGY

Participants in the experiment were recruited through the Predictiv platform, which has access to over 200,000 UK adults. Basic demographic characteristics, such as age, gender, income and location, are available on all of these potential participants and can be used to construct targeted samples. We aimed to recruit approximately 2,000 individuals for the experiment, corresponding to roughly 500 per condition.

We constructed our sample to be representative of the general population in order to maximise the external validity of our experimental findings. This included constructing the sample to reflect the gender, age and regional location (NUTS1[6]) profile of people living in the UK, as well as an equal split according to median income. These demographics were seen as particularly important because gender and age have been shown to strongly influence who visits the Bank's website. A sample reflecting regional and income distributions in the UK was also deemed important in light of rising concerns over inequality, and the knock-on effects inequities can have on public trust and understanding (Haldane 2015).

The experiment was conducted in April and May 2018. A total of 2,275 respondents completed the entire experiment.[7] Participants were only identifiable using a randomly generated ID number. No personally identifiable information was collected from them during the trial. Participants were not explicitly informed about the purpose of the experiment, nor were they made aware that there were different versions of the *Inflation Report* summaries being tested. Participation was entirely voluntary, and participants could (and some did) exit from the experiment at any stage. Participants were financially compensated for the time spent in the test and also received a small variable reward for each correct answer they gave to the direct comprehension questions.

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[6] NUTS1 refers to the highest regional aggregation of Nomenclature of Territorial Units for Statistics (NUTS).
[7] Prior to launching the experiment, we also ran a short pre-trial. Annex 2 includes details on the set-up and results.

After the experiment, we conducted checks for differential attrition across conditions by looking at the proportion of respondents who exited before completing the experiment. Table 3 shows completion rates by condition. There was a statistically significant difference in dropouts between conditions (Annex 3 contains the full regression results). Those who received the Monetary Policy Summary were more likely to drop-out from the experiment than those who received the Relatable Summary. One possible explanation is that, because the Monetary Policy Summary is longer and more technical, this put people off from reading it compared to the Relatable Summary.

We also conducted a series of balance checks to ensure that the age, gender, median income, location and economic engagement was the same across conditions among those who completed the experiment. We find that our sample is balanced across conditions, which suggests that our randomisation was successful on key observable characteristics, despite differential drop-out rates. Annex 4 shows our target and realised sample across key demographic characteristics. Annex 5 shows the distribution of demographic features across the treatments.

Table 3: Completion rates across treatments of the experiment

Condition	Started	Completed	Target N	Completion rate
Monetary Policy Summary	687	538	500	78.31%
Visual Summary	715	563	500	78.74%
Reduced Text Summary	664	546	500	82.22%
Relatable Summary	732	628	500	85.79%
TOTAL	2,798	2,275	2,000	81.30%

IV   OUTCOME MEASURES AND MODELLING APPROACH

The primary focus of our analysis was participants' responses to the five direct comprehension questions. In order to identify any statistically significant differences across the four experimental conditions, we ran ordinary least squares (OLS) regressions with standard errors corrected for heteroscedasticity. In the first regression model, we examined the treatment conditions against the control i.e. the Monetary Policy Summary. Since the Visual Summary is currently used by the Bank, we compared the Reduced Text Summary and Relatability Summary against the Visual Summary in a second regression model. The Monetary Policy Summary was excluded in this specification. The functional form of both regression models is specified in Annex 6. Our significance threshold for both models was established using the Hochberg (1988) step-up procedure to correct for multiple comparisons.[8]

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[8] The increased number of comparisons increases the chance of false positives. Therefore we adjust p-values using the Hochberg step-up procedure. The Hochberg step-up procedure is an adjustment that establishes a

We also conducted a series of secondary regression analyses. These included estimating the impact of different summaries on trust and applied comprehension. As above, in each case, we ran two regression models, one comparing the treatment groups against the Monetary Policy Summary, and another comparing the Reduced Text and Relatability Summaries against the Visual Summary. Our significance threshold for the secondary analysis used a conventional *p*-value level of 0.05.

SECTION 3   RESULTS

I   THE IMPACT OF DIFFERENT SUMMARIES ON COMPREHENSION

Figure 2 shows our findings for the effect of different *Inflation Report* summaries on participants' comprehension scores (see Annex 7 for full regression results). We find that compared to the Monetary Policy Summary, the Visual Summary improved the average comprehension score by 25% (0.5 points). The Reduced Text Summary improved the average comprehension score by 30% (0.6 points) relative to the Monetary Policy Summary, and the Relatable Summary improved direct comprehension scores by 42% (0.8 points) relative to the Monetary Policy Summary. This is equivalent to answering, on average, 2.85 out of 5 questions correctly in the Relatable Summary condition, compared to 2.02 on average in the Monetary Policy Summary condition.[9] The percentage of participants achieving the highest scores was the greatest in the Relatable Summary (see Figure 3). Or, to frame the impact on comprehension differently, we found that around 1 in 8 participants receiving the Monetary Policy Summary got most questions correct (4 or 5 questions right). The number of participants who got most questions correct doubled to 1 in 4 participants in the Visual Summary condition, improving further still to 1 in 3 participants among those in the Relatable Summary condition.

Compared to the Visual Summary, the Relatable Summary increased average comprehension scores by 13% (0.3 points). This is equivalent to answering 2.8 questions on average correctly in the Relatable Summary compared to 2.5 questions on average in the Visual Summary condition. The Reduced Text Summary increased comprehension by a small amount, but not in a statistically significantly way compared to the current Visual Summary.

These patterns broadly hold across each of the five questions, with participants assigned to the Relatable Summary condition understanding more. The exception was the question asking about the

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more rigorous significance threshold than the conventional *p*-value level of 0.05. It adjusts the p-value threshold to report statistical significance to $\alpha/(n - i + 1)$, where α is the significance level, *n* is the number of pairwise comparisons in the main analysis, and *i* is the rank of a p-value. In our direct comprehension analysis, we make five comparisons (the Monetary Policy Summary against each of the three other conditions; and the Reduced Text and Relatable summaries against the current Visual Summary). The obtained p-values are ranked by size, the procedure moves sequentially from highest to lowest p-value, and stops when the first significant result is found. For a sample size of 500 persons per condition, and an assumed standard deviation of 1.5, we have an 80% chance of detecting an effect size of 0.188—0.23 points change on a 5-point scale for our direct comprehension measure. The upper estimate corresponds to a *p*-value of 0.01, while the lower estimate corresponds to a *p*-value of 0.05.

[9] We report conditional i.e. OLS means, as opposed to raw (observed) means. Conditional means take into consideration all factors used in the models e.g. gender, age and so forth.

Bank's interest rate decision, where there was no statistically significant difference across treatments. This is likely because in all four summaries, the interest rate decision was prominently displayed, included either in the headline or given larger font. Full regression results of comprehension by question are included in Annex 8.[10]

Figure 2: Means of comprehension scores in all conditions (conditional least square means based on regression with covariates)[11]

N=2,275
** p<0.01, * p<0.05, + p<0.1

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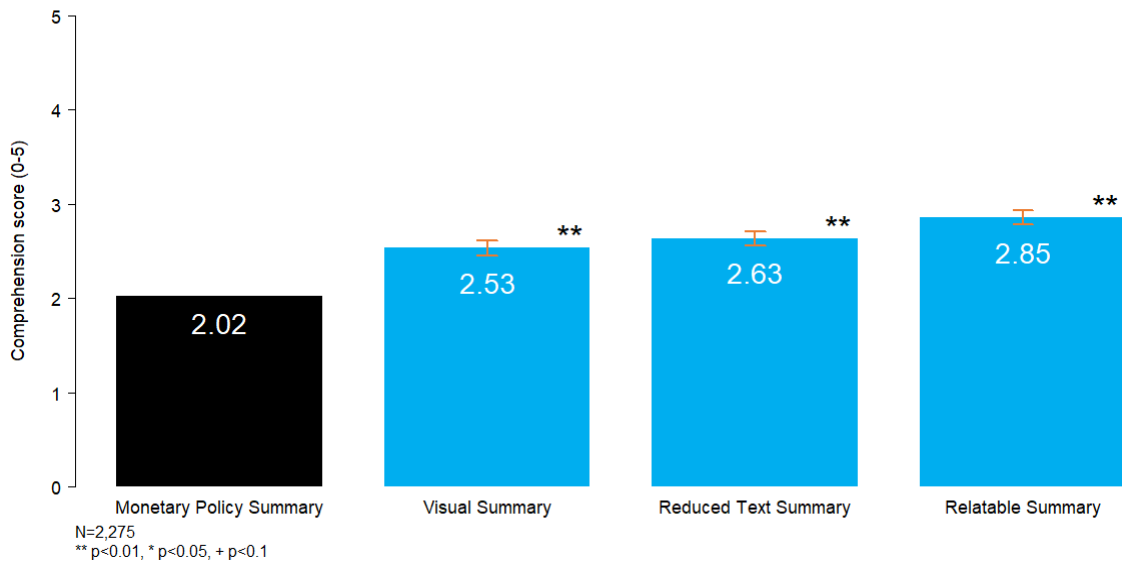
[10] Although answers to the five direct comprehension questions could be found in all four conditions, the phrasing of the questions more closely mirrored language in the Visual Summary, Reduced Text Summary, and Relatable Summary than the Monetary Policy Summary. A fair challenge is whether the phrasing of the questions in this way biased our results. Here it is worth recalling that the Relatable Summary improved comprehension in a statistically significant way compared to the Visual Summary, implying that the differences in comprehension scores are not entirely driven by the phrasing of the questions.

[11] The error bars represent the confidence interval of the difference between each treatment and control, estimated using a linear regression controlling for a number of demographic characteristics. Standard errors were corrected for heteroscedasticity. In this construction, a treatment is significantly different from the control if the lower bound of the confidence interval lies above the estimated mean for the control condition. The same convention is used throughout this paper.

Figure 3: Correct answers to direct comprehension questions (% of participants per condition)
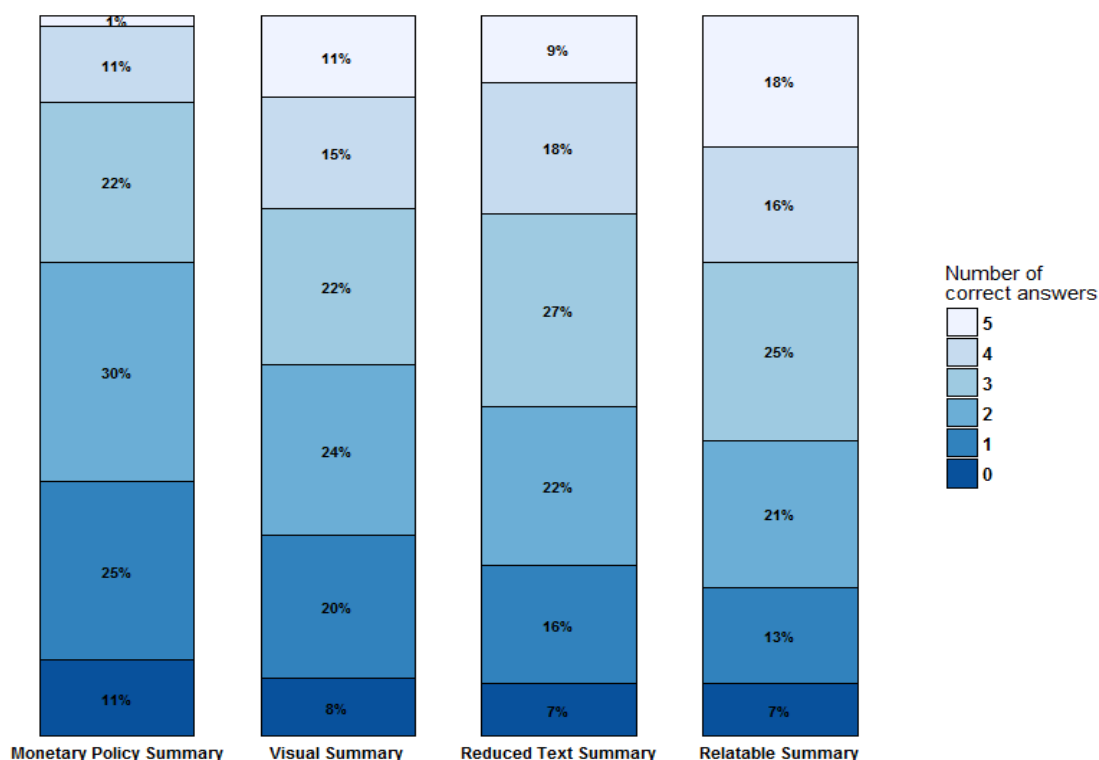
To understand whether participants could apply the information about the Bank's forecasted inflation from the *Inflation Report* summaries to making informed personal decisions, we posed two questions. One was about the cost of groceries next year, and the other about what salary to negotiate to cover changes in the cost of living. Correct answers should be consistent with projected increases in prices of between 2 and 3 percent.[12]

We found that participants who read the Reduced Text Summary and Relatable Summary were significantly more likely to correctly answer the grocery question, compared to participants who read the Monetary Policy Summary (Table 4 and Annex 9). Specifically, the Relatable Summary significantly increased the proportion of correct answers by 32 percentage points compared to the Monetary Policy Summary, more than doubling the number of participants providing correct answers. For the salary question, we found that only the Relatable Summary improved the proportion of correct answers over the Monetary Policy Summary in a statistically significant way, by 15 percentage points.

It is worth noting that across all the experimental conditions there were significant outliers in participant responses to these questions, and that the baseline proportion of correct answers in the control group (receiving the Monetary Policy Summary) is relatively low, at around a quarter. This

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[12] We specifically asked participants to answer the question based on the material they had read, which only discussed average inflation rates. This means that even if, for instance, the inflation rate specific to groceries is forecast to be different to the general inflation rate, participants should still give responses that reflect their perception of general inflation. Since the elicitation focused on the material respondents read, it is important to note that their responses need not overlap with their inflation expectations.

may reflect low baseline understanding of the concept of inflation and low awareness of inflation rates. For instance, Bank of England surveys typically find that when given a small number of options, less than quarter of the public are able to identify the correct range within which current inflation lies (Haldane 2017b).

Table 4: Proportion of participants with 'correct' inflation expectations across treatments (conditional least square means based on regression with covariates)

	Expectations about grocery prices	Expectations about salary prices
Monetary Policy Summary	26.5%	25.3%
Visual Summary	29.7%	25.4%
Reduced Text Summary	35.0%	29.3%
Relatable Summary	58.3%	40.4%

Besides testing participants in our experiment on their understanding of the Bank's main policy messages, we also asked them to assess their own understanding. Participants were asked to what extent they were able to understand the content and material they had just read, answering on a 1-5 scale, where 1 was "none or nearly none of it," and 5 was "all or nearly all or it."

Self-reported comprehension scores followed the same pattern as actual comprehension scores. We found that, compared to the Monetary Policy Summary, the Visual Summary led to a statistically significant improvement of 0.5 points out of 5, in line with the findings of Haldane and McMahon (2018). The Reduced Text Summary improved the score by 0.68 points and the Relatable Summary by 0.94 points (Figure 4). The Relatable Summary also significantly improved scores compared to the Visual Summary (see Annex 10).

Figure 4: Self-reported comprehension scores

N=2,275
** p<0.01, * p<0.05, + p<0.1
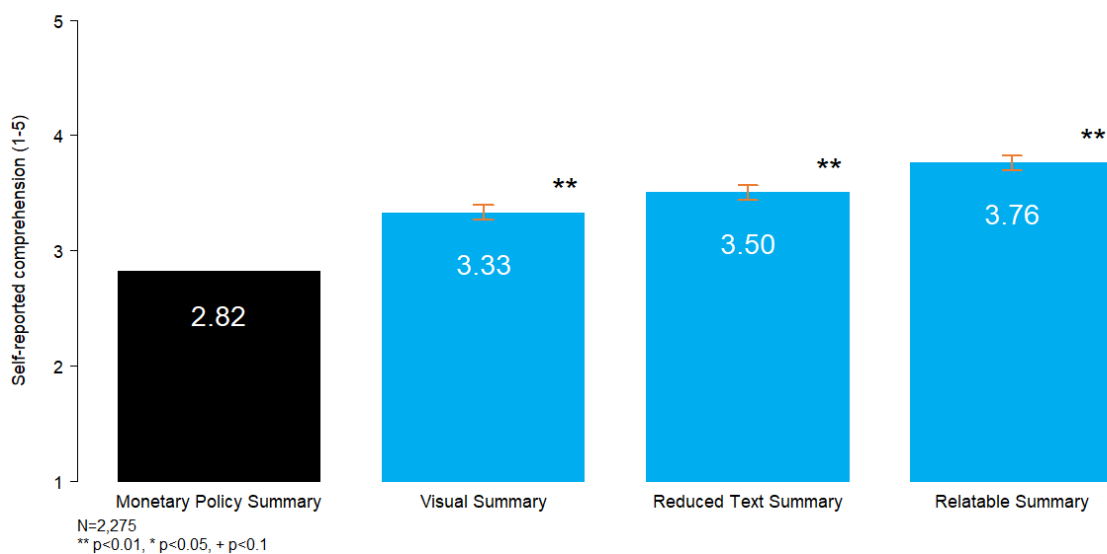
Box 1: The link between economic engagement and comprehension scores

In our experiment, we gathered data on how often participants read economic or business news. We might expect that those who are most engaged with current economic events, defined by those reading economic news once a week or more frequently, would find it easier to answer the comprehension questions. However, we actually found that being 'engaged' had no statistically significant effect on correct answers. Even so, 'engaged' participants were more likely to state that they had understood the summaries they read.

To understand this further, we also looked at the interaction effect between treatments and engagement in the OLS model for direct comprehension scores.   We found that while the effect of the Relatable Summary on comprehension was positive for both 'engaged' and 'disengaged' groups, it was disproportionately beneficial for 'disengaged' respondents. While the engaged group also benefited from the Relatable Summary presentation, they did so to a lesser degree.

While we should caution that interaction effects might be spurious due to multiple comparisons, if we take the results at face value, this suggests that, in general, the effectiveness of different approaches to communication is likely to vary between engaged and disengaged groups. This result lends support to the Bank's approach of layering communications, providing different content for different audiences. See Annex 11 for full regression results.

II   THE IMPACT OF DIFFERENT *INFLATION REPORT* SUMMARIES ON TRUST

We measured participants' trust in the information they read by asking them the following question: "Imagine someone is looking for trustworthy information about the economy. How would you rate the information on the website you have just seen?" Participants had the opportunity to respond to this question by giving a rating from 0 ('distrust completely') to 10 ('trust completely'). In general, participants across the different conditions all tilted towards trusting the information. We found a small but statistically significant difference in trust for participants that read the Relatable Summary (Figure 5). There were no other statistically significant differences across treatments. Annex 12 contains full regression tables.

Figure 5: Trust in the information on the website across different conditions of the experiment
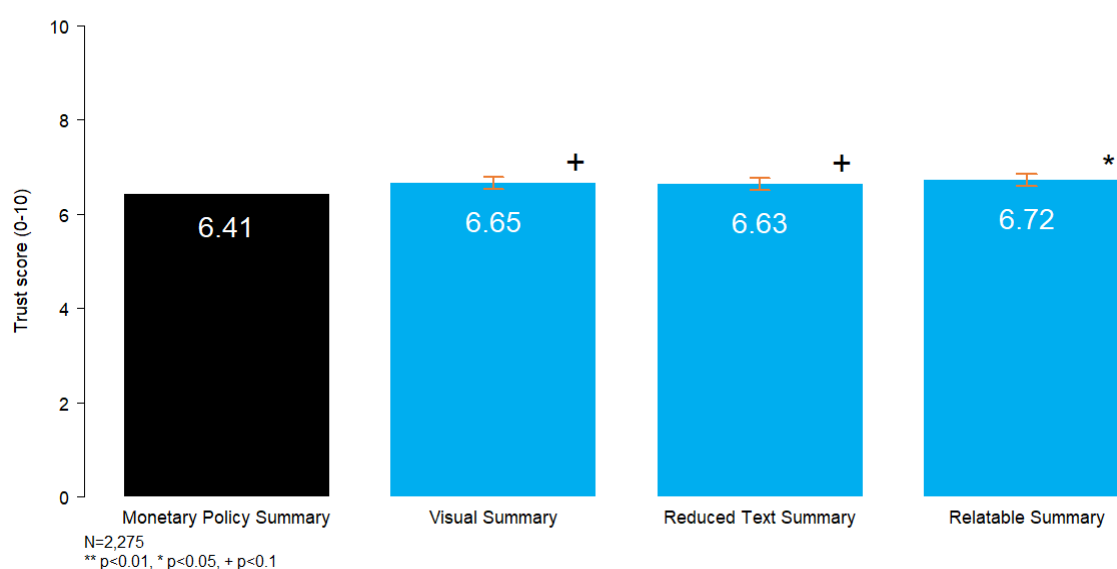
As a follow-up to the trust question, we asked participants to explain why they gave the rating that they did. These were mandatory free-text responses. To understand the reasons why participants chose high or low ratings, we undertook qualitative thematic analysis of 500 randomly sampled free text responses.[13] We defined lower trust participants as those that gave a rating below 5; and higher trust participants as those that gave a rating higher than 5.[14] Table 5 summarises the key themes representing the factors that influence respondents' level of trust in the summaries they read.

Participants with high trust levels generally felt the information provided was simple, clear, came from an unbiased source and was professionally presented. The use of graphics, and 'bite-sized' information was also cited as helpful.

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[13] Some participants entered jumbled letters or otherwise non-usable responses. We excluded these from the analysis before taking a sample of 500 responses.

[14] Scores of 5 were excluded from this analysis.

Participants with lower trust levels were less likely to identify specific reasons for a lack of trust in the information. Among those who answered in greater depth, participants felt that information did not resonate with them either because of the language used or the topics discussed; or they felt it did not conform to their preconceptions which, as previous research has shown, often persist even in the face of contrary facts (Harford 2017). Some with low trust also felt uncertain about the veracity of online information. Others expressed general mistrust of the financial system.

The thematic analysis indicates that making information easier to understand is likely to be an important means for increasing trust. How the information relates to people's lived experiences is also relevant to how trusting people are of economic information. At the same time, it is also important to recognise that improving the clarity of communication can only go so far in improving trust. Wider perceptions of the financial system and past experiences also seem to matter.

Table 5: Key themes emerging from qualitative analysis of free text responses

Spectrum of Trust	
Higher trust	**Lower trust**
Clarity of information • Clear and easy to understand • Bite-sized, smaller paragraphs of information **Information targets all audiences** • Simplified information that is easy for most people to understand • Enjoyable and interesting information makes topic less confusing **Presentation of information** • Visually professional • Layout of information is easy to navigate • Use of graphs and illustrations **Current economic relevance** • Feeling the information was accurate and relevant to the economy **Unbiased information** • Feeling that it was unbiased factual information	**Personal knowledge and understanding** • Lack of knowledge of finance, banking and economics • Disagreement with information provided based on personal knowledge/opinions **Online method of communication** • Distrust in online platforms as a source of information **Lack of information's correspondence to respondents' reality** • Information that doesn't relate to respondents' situation/reality financially and economically **Uncertainty about the source of information** • Uncertain of the source of information • Difficulty trusting information represented by one source only **Unclear information** • Too much jargon/acronyms • Too complex to understand • Too long to concentrate on and comprehend

Wider perceptions	
Trusted source of information	**Lack of trust in financial institutions**
• General overarching trust in the 'independent' source of information	• General overarching lack of trust in financial institutions
	Changing nature of economy
	• Changing nature of the economy makes information difficult to trust the (accuracy) of statistics provided

We also asked participants about how the summary they read affected their perceptions of the Bank of England, to allow us to compare our results to those of Haldane and McMahon (2018). The possible responses ranged from Worsened Significantly (1) to Improved Significantly (5).

In general, the summaries made little difference to how the Bank was perceived by participants. Across all conditions, the average score was roughly 3, meaning no change in perception. Even so, participants who read the Relatable Summary reported improvements in their perceptions of the Bank that were on average 0.28 points higher than those who read the Monetary Policy Summary, a statistically significant effect. The Visual Summary and the Reduced Text Summary also improved perceptions relative to the Monetary Policy Summary in statistically significant, but smaller, ways (Figure 6). The difference between the Relatable Summary and the Visual Summary was also statistically significant. See Annex 13 for full details.

Our findings differ from those reported by Haldane and McMahon (2018) asking the same question. They found that, although the Visual Summary improved participants' perception of the Bank of England, there was a statistically significant only among economics students, but not among the general public. A possible explanation for why we find a statistically significant effect in our study is that our study has more statistical power to detect smaller effect sizes.

Figure 6: The effect of different summaries on perceptions of the Bank of England

N=2,275
** p<0.01, * p<0.05, + p<0.1
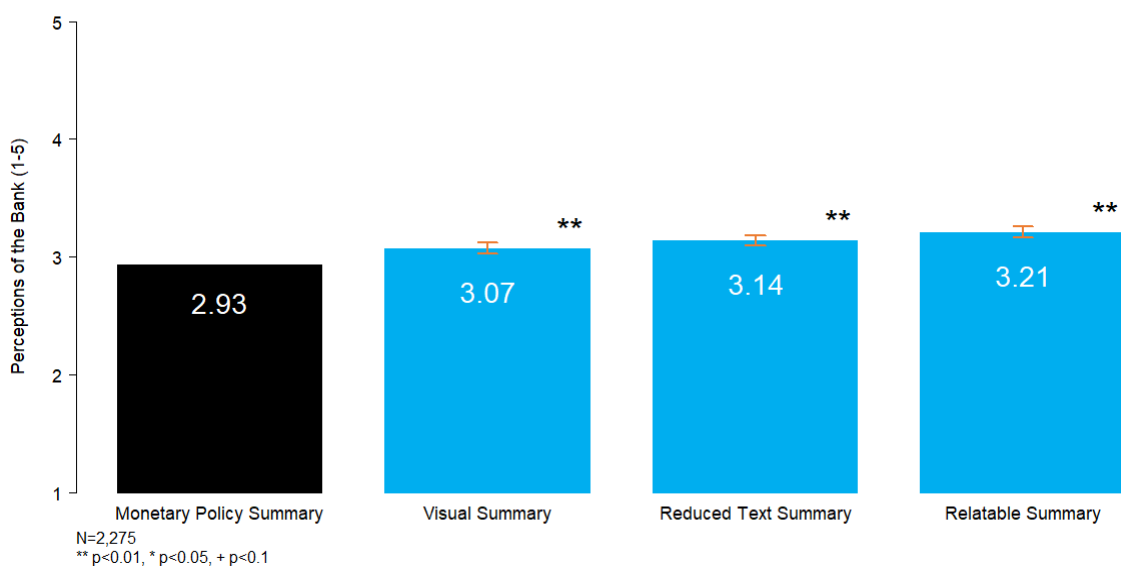
III   CAVEATS TO OUR CONCLUSIONS

While we believe our findings are robust, it is worth flagging some caveats and qualifications.

The first qualification pertains to the external validity of our findings. Respondents in the experiment received financial compensation in exchange for participating, whereas visitors to the Bank's website in reality do not receive remuneration. Furthermore, while we recruited our sample to be representative of the UK population in terms of gender, age, location and median income, it is possible that there are unobservable differences between this sample and the people who would interact with the Bank's website in practice, for example, in terms of ethnicity and educational level.

Still, we believe that the impact of this qualification is limited. First, various methodological papers in experimental economics find that results from online experiments replicate those established in laboratory settings, including those run with general population samples (Horton, Rand and Zeckhauser 2011; Amir, Gal and Rand 2012). Moreover, our test captures a range of covariates that could reflect different levels of comprehension and trust in the *Inflation Report* summaries. This gives us confidence that the positive effects of the Relatable Summary would hold outside the experimental environment.

A second caveat is around the differential attrition rates we observed across treatments. As noted earlier, more respondents dropped out if they were allocated to the Monetary Policy Summary or Visual Summary conditions than if they were allocated to the Reduced Text or Relatable Summaries. Differential attrition raises the concern of sample selection, which could bias our results. In other words, if different types of participants completed each treatment due to differential attrition, there is a concern that our inferences about the effect on comprehension may be driven by factors other than our treatments. We ran balance checks to see whether our sample was different on

observables following the attrition and found no significant differences between treatments. This reinforces the robustness of the results. It should be noted, however, that there is still a chance that unobservable characteristics affected the attrition and in turn may have impacted our key outcomes. Nonetheless, we do not have strong reasons to believe that the attrition is correlated with any unobservable characteristics. In addition, since our treatment groups remain balanced on observable characteristics, we believe our results are robust.

A third caveat to note is that we tested direct comprehension of the Bank's key messages in isolation from each other. We did not test whether participants were able to understand the linkages between different pieces of information, and understand (or agree with) how those pieces of information summed up to the Monetary Policy Committee's interest rate decision. The extent to which the public understands the Bank's key messages holistically could be a future area for research, particularly because some focus groups that have been conducted by the Bank before have reported some people prefer more information, rather than less.

Finally, our study included two measures that are likely to capture aspects of trust. One of these measured changes in perceptions of the Bank, and the other aimed to capture trustworthiness of the information received. It is possible that these measures are picking up slightly different aspects of trust, and it is difficult to say which measure is most reliable. There also might be other aspects of trust that we have failed to capture. Moreover, it is not clear whether and how much these measures would translate to other outcomes of interest, such as increased engagement with the Bank. Given the constitutive role of trust in underpinning the monetary and financial system, we believe that more research here would be useful.

SECTION 4   CONCLUSION

Once upon a time, it was said that the job of the Bank of England's Press Office was 'to keep the Bank out of the press and the press out of the Bank' (as reported in Capie 2012). To the extent that the Bank communicated externally, so an old adage goes, it did so non-linguistically, by the Governor raising his eyebrow (Haldane 2017a).

But times have changed. Today enhancing the Bank of England's external communications sits at the very heart of its Vision 2020 strategy. This includes expanding the ways the Bank communicates. For example, the Bank recently created a set of online educational resources called EconoME targeted at 11-16 year old students. To help embed the teaching of this material, as well as promote wider knowledge of what central banks do, the Bank has launched a new Ambassadors programme through which staff at all levels of the organisation are undertaking visits to state schools (Carney 2018). Alongside these educational initiatives aimed at schoolchildren, the Bank is also enhancing how it engages with adults. For example, the Bank recently announced that it is setting up citizen councils, with the ambition to establish regular channels for promoting better communication between the Bank and the public around the UK (Haldane 2018).

Taken together, these initiatives represent a significant departure from the Bank's historic reticence. Indeed our main results largely validate the Vision 2020 strategy. The Bank's recently introduced Visual Summary of the *Inflation Report* improves comprehension of the Bank's policy messages compared to the Bank's traditional Monetary Policy Summary. Even so, our research also suggests that the Bank could further improve public comprehension of, and trust in, its policy messages if its communications were more relatable. However, while we find that making the information more relatable can substantially increase comprehension, it is striking that the level of, especially applied, comprehension was relatively low.

We have just scratched the surface of a very rich terrain that other researchers could explore. There are several directions that could be pursued. One involves exploring the component parts of relatability. Relatability in our experiment had several components. It included linguistic involvement, ordinary words, visual personalisation, and a salient, coherent narrative related back to people's daily lives. Some of these strategies seem to have been more effective than others. For instance, only 9.9% of participants in the Relatable Summary interacted with the chart of regional unemployment, which is slightly less than the percentage of participants who clicked on the charts in the published Visual Summary (11.7%). Future research could identify which components of relatability are most effective at promoting comprehension and trust by isolating these components while holding other factors constant. Such research could also usefully test different approaches to communicating the uncertainty of economic forecasts, drawing on the existing behavioural science literature on how to communicate risk and probabilities (Gigerenzer and Edwards 2003; Spiegelhalter 2017).

The identification of other techniques besides relatability to improve general public comprehension and trust would also be useful. For example, there is a large literature on how to effectively present information, largely unknown in the field of economics, which could be plumbed for further insight (Cleveland and McGill 1984; Shah and Carpenter 1995; Shah and Hoeffner 2002; Few 2004; Ware 2004; Hegarty 2011; Cairo 2013; Yau 2013; Borkin et al. 2013; Talbot, Setlur and Anand 2014). Some of the techniques described in this literature are micro-interventions in terms of how charts are labelled and coloured. Others involve optimising chart type, and striking the right balance and position between visuals and text.

Separately, a raft of research in psychology and behavioural economics has uncovered a range of biases that affect how people process and interpret information. For instance, confirmation bias describes the tendency for people to seek out or evaluate information in ways that validate their preconceptions (Lord, Ross and Lepper 1979). Availability bias means that people often over-estimate the probability of an event occurring based on how easily an example of such an event comes to mind (Tversky and Kahneman 1974; Nickerson 1998). It could be fruitful to explore whether these behavioural biases impact people's comprehension and perceptions of macroeconomic trends and forecasts, and how central banks could present information to overcome these biases. The behavioural literature also finds that there are messenger effects. This refers to the tendency for people to give different weight to information depending on who is communicating it to them (Wilson and Sherrell 1993). One way to explore the effect of messengers could be an experiment where one set of participants are given unlabelled information, while the other are given the exact same information but told that the source is the central bank.

Finally, we would like to conclude on a cautious note, by flagging the constrained reach of central bank communications, and therefore the limits of any enhancements to them on public comprehension and trust in a central bank's policy messages. For now, the public in the main does not receive policy messages directly from the central bank, but rather receives them via the press and social media. For example, while the Bank's website traffic makes it the 6,035[th] most visited website in the UK according to Alexa— a website tracking company— the BBC, the *Guardian*, and the *Daily Mail* are all in the top 100.[15] This means that the way in which the Bank's economic forecasts and the Monetary Policy Committee's decisions are explained and interpreted will vary across different media channels. A potentially informative, albeit provocative, experiment would be to give a control group a summary of the *Inflation Report* from the Bank, and compare differences in public comprehension and trust to treatment groups who read summaries of the *Inflation Report* written by different media sources, with the sources of the material unlabelled.

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[15] Full ranking is available at https://www.alexa.com/topsites/countries/GB. Accessed on 7 June 2018.

REFERENCES

Abeler, J., and Jäger, S. 2015. Complex tax incentives. *American Economic Journal: Economic Policy 7*(3), 1-28.

Allard, J., Catenaro, M., Vidal, J-P., and Wolswijk, G. 2013. Central bank communication on fiscal policy. *European Journal of Political Economy* 30(C): 1-14.

Amir, O., Gal, Y.K., and Rand, D. G. 2012. Economic games on the internet: The effect of $1 stakes. *PloS one* 7(2) e31461.

Apel, M., and Grimaldi, M. 2012. The Information Content of Central Bank Minutes. *Sveriges Riksbank Working Paper* No. 261.

Armantier, O., Bruine de Bruin, W., Topa, G., Klaauw, W., and Zafar, B. 2015. Inflation expectations and behavior: Do survey respondents act on their beliefs? *International Economic Review* 56(2): 505-536.

Behavioural Insights Team. 2012. Applying Behavioural Insights to Reduce Fraud, Error and Debt *Cabinet Office.* Available at: http://38r8om2xjhhl25mw24492dir.wpengine.netdna-cdn.com/wp-content/uploads/2015/07/BIT_FraudErrorDebt_accessible.pdf

Ben-Shahar, O., and Schneider, C. E. 2014. *More Than You Wanted to Know: The Failure of Mandated Disclosure*. Princeton: Princeton University Press.

Bholat, D., Brookes, J., Cai, C., Grundy, K., and Lund, J. 2017. Sending firm messages: text mining letters from PRA supervisors to banks and building societies they regulate. *Bank of England Staff Working Paper* No. 688.

Biber, D. 1991. *Variation across Speech and Writing*. Cambridge: Cambridge University Press.

Binder, C. 2017. Fed speak on main street: Central bank communication and household expectations. *Journal of Macroeconomics* 52: 238-251.

Blinder, A. 2009. Talking about monetary policy: the virtues (and vice?) of central bank communication. *Bank for International Settlements Working Paper* No. 274.

Borkin, M., Vo, A., Bylinskii, Z., Isola, P., Sunkavalli, S., Oliva, A., and Pfister, H. 2013. What makes a visualization memorable? *IEEE Transactions on Visualization and Computer Graphics* 19(12): 2306-2315.

Bulir, A., Cihak, M., and Jansen, D-J. 2014. Does the clarity of inflation reports affect volatility in financial markets? *International Monetary Fund Working Paper* No. 14/175.

Cairo, A. 2013. *The functional art: an introduction to information graphics and visualization.* Berkeley: New Riders.

Capie, F. 2012. *The Bank of England: 1950s to 1979*. Cambridge: Cambridge University Press.

Carney, M. 2018. Opening remarks at the econoME launch event. Speech at the Bank of England. Available at: https://www.bankofengland.co.uk/-/media/boe/files/speech/2018/opening-remarks-by-mark-carney-at-the-econome-launch-event.pdf

Chernev, A., Böckenholt, U., and Goodman, J. 2015. Choice overload: A conceptual review and meta-analysis. *Journal of Consumer Psychology* 25(2): 333-358.

Cleveland, W., and McGill, R. 1984. Graphical Perception: Theory, Experimentation, and Application to the Development of Graphical Methods. *Journal of the American Statistical Association* 79(387): 531-554.

Draghi, M. 2014. Central Bank Communication. Speech given at European Central Bank PR Manager of the Year Award. Available at:
https://www.ecb.europa.eu/press/inter/date/2014/html/sp140804.en.html

Earle, J., Moran, C., and Ward-Perkins, Z. 2017. *The Econocracy: On the perils of leaving economics to the experts*. Manchester: Penguin.

Edelman. 2018. 2018 Edelman Trust Barometer Global Report. Available at: https://cms.edelman.com/sites/default/files/2018-01/2018%20Edelman%20Trust%20Barometer%20Global%20Report.pdf

Ehrmann, M., and Talmi, J. 2017. Starting from a blank page? Semantic similarity in central bank communication and market volatility. *European Central Bank Working Paper* No. 2023.

Feldman, N. E., Katuščák, P., and Kawano, L. 2016. Taxpayer confusion: Evidence from the child tax credit. *American Economic Review* 106(3): 807-35.

Few, S. 2004. *Show Me the Numbers: Designing Tables and Graphs to Enlighten*. Oakland: Analytics Press.

Financial Conduct Authority. 2014. Does the framing of retirement income options matter? A behavioural experiment. Available at: https://www.fca.org.uk/publication/research/rims-framing-experiment.pdf

Fullwood, J. 2016. A cat, a hat and a simple measure of gobbledygook: how readable is your writing. *Bank Underground*. Available at: https://bankunderground.co.uk/2016/10/04/a-cat-a-hat-and-a-simple-measure-of-gobbledygook-how-readable-is-your-writing/

Galizzi, M., and Navarro-Martínez, D. 2017. On the external validity of social preference games: a systematic lab-field study. Available at:
http://eprints.lse.ac.uk/84088/1/Galizzi_On%20external%20validity_2017.pdf

Garner, R. 2005. Post-It® note persuasion: a sticky influence, *Journal of Consumer Psychology*, 15(3): 230–237.

Gigerenzer, G., and Edwards, A. 2003. Simple tools for understanding risks: from innumeracy to insight. *British Medical Journal*, 327(7417): 741–744.

Glazebrook, K., Larkin, C., and Costa, E. 2017. Improving engagement with pension decisions: The results from three randomised controlled trials. Available at: http://38r8om2xjhhl25mw24492dir-wpengine.netdna-ssl.com/wp-content/uploads/2017/10/Pension-wise-trials.pdf

Goodhart, C., and Lastra, R. 2017. Populism and central banks. *Open Economies Review* 29(1): 49-68.

Gürkaynak, R., Sack, B., and Swanson, E. 2005. Do actions speak louder than words? The response of asset prices to monetary policy actions and statements. *International Journal of Central Banks* 1(1): 55-93.

Haldane, A. 2015. Growing, Fast and Slow. Speech given at the University of East Anglia. Available at: https://www.bankofengland.co.uk/-/media/boe/files/speech/2015/growing-fast-and-slow.pdf?la=en&hash=621B4A687E7BC1FE101859779E1DFFE546A1449F

Haldane, A. 2017a. A little more conversation, a little less conversation. Speech given at the Federal Reserve Bank of San Francisco Macroeconomics and Monetary Policy Conference. Available at: https://www.bankofengland.co.uk/-/media/boe/files/speech/2017/a-little-more-conversation-a-little-less-action.pdf

Haldane, A. 2017b. Everyday economics. Speech given at Birmingham's Nishkam High School. Available at: https://www.bankofengland.co.uk/-/media/boe/files/speech/2017/everyday-economics.pdf

Haldane, A. 2018. Climbing the Public Engagement Ladder. Speech at the Royal Society for the encouragement of Arts, Manufactures and Commerce. Available at: https://www.bankofengland.co.uk/-/media/boe/files/speech/2018/climbing-the-public-engagement-ladder.pdf

Haldane, A., and McMahon, M. 2018. Central Bank Communication and the General Public. *American Economic Review: Papers & Proceedings*.

Hansen, S., McMahon, M., and Prat, A. 2014. Transparency and Deliberation within the FOMC: A Computational Linguistics Approach. *London School of Economics Centre for Economic Performance Discussion Paper* No. 1276

Harford, T. 2017. The problem with facts. *Financial Times*. Available at: https://www.ft.com/content/eef2e2f8-0383-11e7-ace0-1ce02ef0def9

Harris, Q., Mercieca, A., Soane, E., and Tanaka, M. 2017. How do bonus cap and clawback affect risk and choice? Insight from a lab experiment. Available at: https://www.phd-finance.uzh.ch/dam/jcr:c5ca7271-8f77-41f9-8a24-7d42edd4919e/seminar_contract_theory_paper_Tanaka.pdf

Hegarty, M. 2011, The Cognitive Science of Visual-Spatial Displays: Implications for Design. *Topics in Cognitive Science* 3(3): 446-474.

Hendry, S., and Madeley, A. 2010. Text mining and information content of Bank of Canada communications. *Bank of Canada Staff Working Paper* No. 31.

Hochberg, Y. 1988. A sharper Bonferroni procedure for multiple tests of significance. *Biometrika* 75(4): 800-802.

Holmes, D. 2013. *Economy of Words: Communicative Imperatives in Central Banks*. Chicago: University of Chicago Press.

Horton, J. J., Rand, D. G., and Zeckhauser, R. J. 2011. The online laboratory: conducting experiments in a real labor market. *Experimental Economics* 14(3): 399-425.

Iscenko, Z., Duke, C., Huck, S., and Wallace, B. 2014. How does selling insurance as an add-on affect consumer decisions? A practical application of behavioural experiments in financial regulation. *Financial Conduct Authority Occasional Paper* No. 3.

Jansen, D. J., and De Haan, J. 2010. An Assessment of the Consistency of ECB Communication using Wordscores. *De Nederlandsche Bank Working Paper* 259.

Jost, A. 2017. Is Monetary Policy Too Complex for the Public? Evidence from the UK. *Swiss National Bank* Working Paper 15.

Kohn, D. 2011. Enhancing financial stability: the role of transparency. Speech at the London School of Economics. Available at: https://www.bankofengland.co.uk/-/media/boe/files/speech/2011/enhancing-financial-stability-the-role-of-transparency-speech-by-donald-kohn

Kumar, S., Afrouzi, H., Coibion, O., and Gorodnichenko, Y. 2015. Inflation Targeting Does Not Anchor Inflation Expectations: Evidence from Firms in New Zealand. *National Bureau of Economic Research Working Paper* No. 21814.

Kynaston, D. 2017. *Till Time's Last Sand: A History of the Bank of England 1694-2013*. London: Bloomsbury.

Loewenstein, G., Friedman, J. Y., McGill, B., Ahmad, S., Linck, S., Sinkula, S., Beshears, J., Choi, J. J., Liabson, D., Madrian, B. C., List, J.A., and Volpp, K.G. 2013. Consumers' misunderstanding of health insurance. *Journal of Health Economics* 32(5): 850-862.

Lord, C. G., Ross, L., & Lepper, M. R. 1979. Biased Assimilation and Attitude Polarization: The Effects of Prior Theories on Subsequently Considered Evidence. *Journal of Personality and Social Psychology* 37(11): 2098-2109.

Money Advice Service, Behavioural Insights Team and Ipsos Mori. 2017. A behavioural approach to managing money: Ideas and results from the Financial Capability Lab. Available at https://www.behaviouralinsights.co.uk/publications/a-behavioural-approach-to-managing-money-ideas-and-results-from-the-financial-capability-lab/

Montes, G. C., Oliveira, L. V., Curi, A., and Nicolay, R. 2015. Effects of transparency, monetary policy signalling and clarity of central bank communication on disagreement about inflation expectations. *Applied Economics* 48(7): 590-607.

Nickerson, R. S. 1998. Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology* 2(2)*:* 175-220.

Perry, V. G., and Blumenthal, P. M. 2012. Understanding the Fine Print: The Need for Effective Testing of Mandatory Mortgage Loan Disclosures. *Journal of Public Policy & Marketing* 31(2): 305–312.

Schonhardt-Bailey, C. 2013. *Deliberating American Policy: A Textual Analysis*. Cambridge: MIT Press.

Shafik, M. 2017. In experts we trust? Speech given at Oxford Union. Available at: https://www.bankofengland.co.uk/-/media/boe/files/speech/2017/in-experts-we-trust.pdf

Shah, P., and Carpenter, P. A. 1995. Conceptual limitations in comprehending line graphs. *Journal of Experimental Psychology: General* 124(1): 43-61.

Shah, P., and Hoeffner, J. 2002. Review of Graph Comprehension Research: Implications for Instruction. *Educational Psychology Review* 14(1): 47-69.

Shiller, R. 2017. Narrative economics. *National Bureau of Economic Research Working Paper* 23075.

Siklos, P. L. 2013. The Global Financial Crisis and the Language of Central Banking: Central Bank Guidance in Good Times and in Bad. *Centre for Applied Macroeconomic Analysis Working Paper* 58.

Smart, L. 2016. Full disclosure: a round-up of FCA experimental research into giving information. *Financial Conduct Authority Occasional Paper* 23.

Smith, M. 2017. Leave voters are less likely to trust any experts – even weather forecasters. *YouGov*. Available at: https://yougov.co.uk/news/2017/02/17/leave-voters-are-less-likely-trust-any-experts-eve/

Spiegelhalter, D. 2017. Risk and uncertainty communication. *Annual Review of Statistics and Its Application* 4: 31-60.

Talbot, J., Setlur, V., and Anand, A. 2014. Four experiments on the perception of bar charts. *IEEE Transactions on Visualization and Computer Graphics* 20(12): 2152-2160.

Taubinsky, D., and Rees-Jones, A. 2016. Attention variation and welfare: theory and evidence from a tax salience experiment. *National Bureau of Economic Research Working Paper* 22545

Tucker, P. 2018. *Unelected power: The quest for legitimacy in central banking and the regulatory state*. Princeton: Princeton University Press.

Tversky, A., and Kahneman, D. 1974. Judgment under uncertainty: Heuristics and biases. *Science* 185(4157): 1124-1131.

Ware, C. 2004. *Information Visualization: Perception for Design*. San Francisco: Morgan Kaufman.

Wilson, E. J., and Sherrell, D. L. 1993. Source effects in communication and persuasion research: A meta-analysis of effect size. *Journal of the Academy of Marketing Science* 21: 101.

Yau, N. 2013. *Data points: visualization that means something*. Indianapolis: Wiley.

Yellen, J. L. 2013. Communication in Monetary Policy. Speech at the Society of American Business Editors and Writers 50th Anniversary Conference. Available at: https://www.federalreserve.gov/newsevents/speech/yellen20130404a.htm

Visual summary - Inflation Report February 2018

ⓘ The outlook for the economy

At the Bank of England, we set interest rates to support the economy and to keep inflation at 2%

Our decision in a nutshell

Interest rates kept at
0.5%

The fall in the pound has led to higher prices

The world economy is growing strongly

The squeeze in living standards is easing

Inflation will fall back towards our 2% target

The economy now needs a little less support

Over the past few years, the Bank of England kept interest rates very low to support the economy to recover from the global financial crisis.

But now the world economy is strengthening and more people are in work. The UK economy needs a little less support from us.

The economy is strong enough for us to remove some support

Inflation and the fall in the pound

Inflation is currently above our 2% target. The big fall in the pound following the Brexit vote has meant that things businesses get from abroad cost more. Businesses need to pass these costs on to their customers. That has meant higher prices in shops.

However, in the next few months, we expect inflation to start falling back gradually towards our target.

The pound has fallen since the Brexit vote

CHART See how the pound has fallen since the Brexit vote   ⊖

Trade weighted exchange rate

Fall in the value of the pound

EU referendum

Jan 15   Jul 15   Jan 16   Jul 16   Jan 17   Jul 17   Jan 18

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31
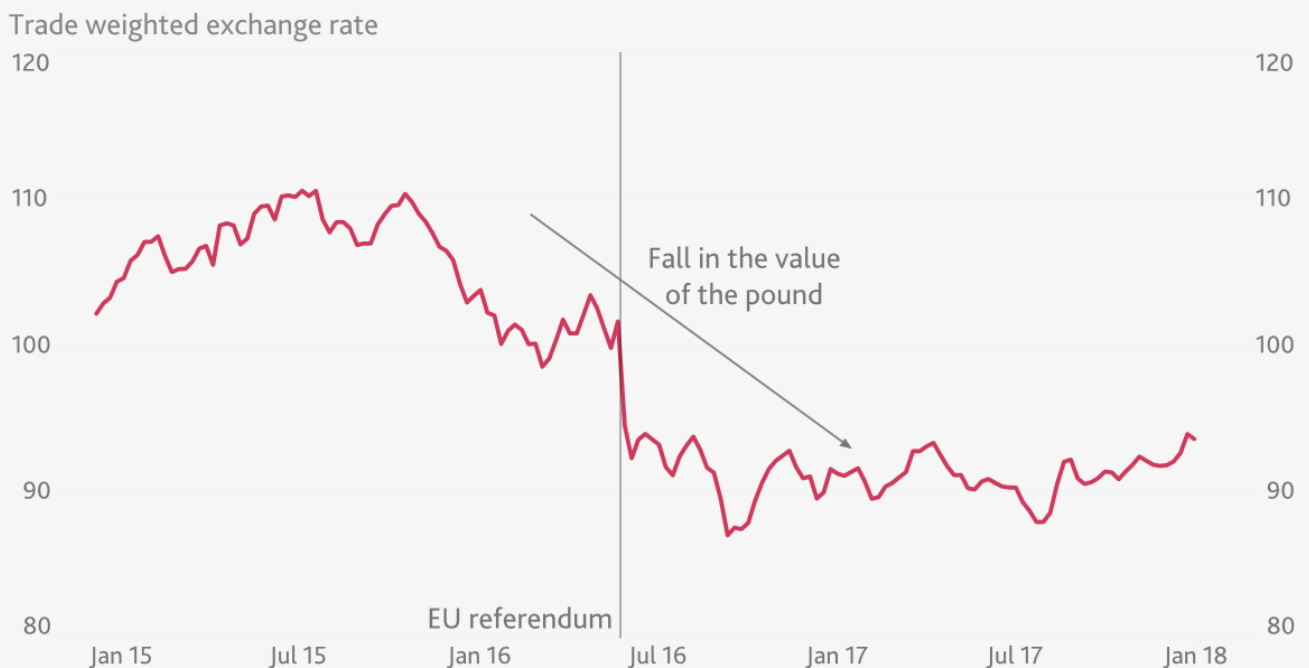
A strong world economy

Across Europe, the US and many other countries, the economy is growing strongly. This will benefit the UK by increasing demand for our exports. This should encourage companies to invest and recruit more staff.

Stronger growth in the world economy will benefit the UK

The squeeze on pay is easing

The share of people out of work is at its lowest level since 1975. And there are a lot of job vacancies. We expect bigger pay rises over the next few years as companies offer higher wages to recruit and retain workers.

We expect that pay will therefore rise faster than prices this year.

We think that pay will rise faster than prices this year

CHART See how we expect pay to start to rise more than prices ⊖

Pay growth and inflation (% change)

We think that pay will rise faster than prices this year

Pay

Inflation

Projection

2004   2006   2008   2010   2012   2014   2016   2018   2020
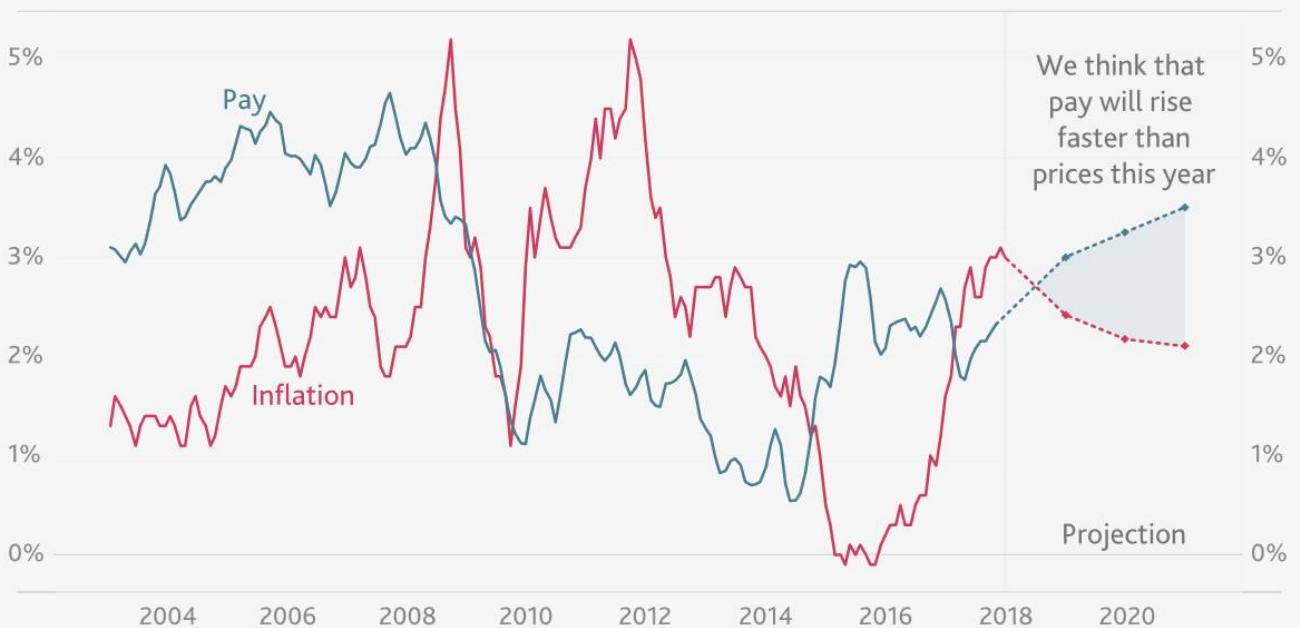
Getting inflation back to target

To meet our 2% inflation target, we need to set interest rates so that the amount of spending in the economy isn't too low or too high. If we set interest rates too low, growth in the economy will be too fast, and inflation will stay above our target. But if we set interest rates too high, growth will be too slow, and inflation will fall below our target.

We set interest rates to get inflation back to our 2% target

See how we expect inflation to fall back towards our target

Inflation (% change)

We think inflation will fall back towards the target

Our target rate 2%

Projection

2004   2006   2008   2010   2012   2014   2016   2018

Over the next few years, we think that if the economy grows more quickly than 1½% a year, this will lead to inflation above our 2% target.

For the economy to grow faster than 1½% a year without causing higher inflation, productivity would need to increase. Productivity is our ability to produce more with the people already in work and the resources that we have. However, we expect productivity to grow slowly over the coming years.

SLOW DOWN

1½%

The economy can only grow so fast before it leads to higher inflation

Productivity (output per hour worked)

Productivity has hardly grown since the financial crisis

Financial crisis

1971 1976 1981 1986 1991 1996 2001 2006 2011 2016

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The interest rate decision

We have kept interest rates at 0.5%. We think this is the right rate to ensure that inflation returns to the 2% target.

We have kept interest rates at

0.5%

Visual summary - Inflation Report February 2018

(i) The outlook for the economy

We have kept interest rates at

0.5%

What we do at the Bank of England

At the Bank of England, we set interest rates to support the economy. We try to make sure that the prices you pay don't rise more than 2% per year.

For you that means...

A basket of goods and services that cost you £100 this year...

2018 RECEIPT
£100

2019 RECEIPT
£102

...should cost you £102 next year

This time we decided to keep interest rates at 0.5%.

Why we decided to keep interest rates at 0.5%

1. PRICES: We expect price rises to slow down to our 2% target soon

2. JOBS: A record number of people have jobs

3. PAY: Pay is expected to rise faster than prices

1. PRICES

Right now, prices are rising faster than the Bank's 2% target. You may have noticed that the price of things you buy in the shops have been going up more quickly than 2%.

A basket of goods and services that cost you £100 last year...

2017 RECEIPT £100   **2018 RECEIPT £103**

...costs you £103 this year. This rise is bigger than 2%.

That's because of the fall in the pound following the Brexit vote. The fall in the pound means that holidays abroad and things bought from other countries cost more.

However, the good news is that we expect price increases to slow down to 2% soon.
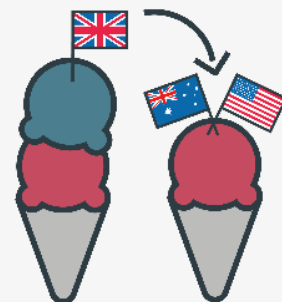
A holiday abroad is more expensive now than it was before the Brexit vote

2. JOBS

A record number of people have jobs and there are a lot of jobs available. The share of people without a job (unemployment) is at its lowest level for over 40 years.

Job opportunities in the UK are likely to get even better. People in the US, Europe and many other countries are getting richer, which increases demand for the goods and services we send abroad. Companies in the UK will need to recruit more staff to meet this extra demand.

CHART Look at what unemployment is like in your area   ⊖

Select your region

West Midlands   ▼
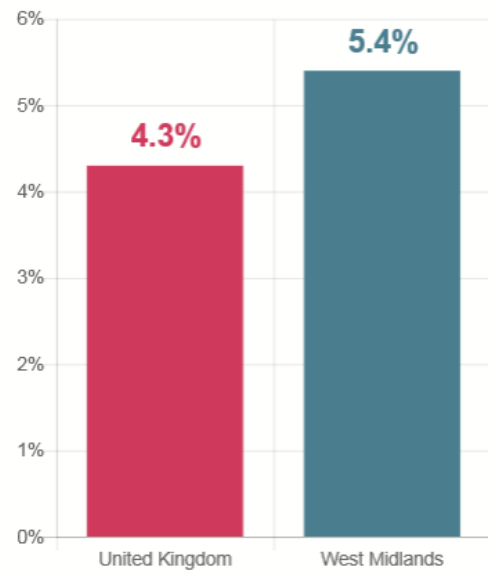
Source: ONS data

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3. PAY

With lots of people already in work, companies have to offer higher wages to recruit and retain workers.

So expect pay to rise faster than prices this year. This means you may be able to afford more.

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The interest rate decision

In summary, we expect price rises to slow down to our 2% target soon. More people are in work and we expect pay to rise. For these reasons, we have decided that interest rates are right where we want them to be for the UK economy to do well.

We have kept interest rates at
0.5%

ANNEX 2   PRE-TRIAL OF EXPERIMENT

Prior to going live with the experiment, we ran a short pre-trial with over 100 respondents. The pre-test focused on the two profile questions and the two applied comprehension questions.

The pre-trial had two aims. The first aim was to understand the distribution of the public with an economics or related degree, and the frequency with which the public reports reading economics news. As we planned to use the economics/non-economics degree, and engaged with 'economic news or business news'/'disengaged with economic or business news' as a means for segmenting our respondents in the experiment, we wanted to check if these pairs would be roughly balanced. The second aim of the pre-trial was to understand the potential distribution of responses to the applied comprehension questions. Previous research conducted by BIT with the Monetary Authority of Singapore asked similar questions and found that there was a wide range of answers depending on how the questions were phrased, and the scales used. The pre-trial offered an opportunity to see if responses to our applied comprehension questions looked broadly sensible.

The table below summarises the headline findings, as well as revisions that were made off the back of these results to the design of our experiment. Figure 1 and Table 2 provide descriptive statistics from the pre-trial.

Table 1: Headline findings from the pre-trial

Aim	Headline results	Revisions
1	There was a fairly even split between disengaged/engaged respondents based on their reported frequency of reading economic/business news. Specifically, 52% qualified as disengaged according to our definition (reads the news 'about once a month' or 'never/hardly ever') and 48% as engaged (reads 'every day' or 'about once a week').	Based on these results, we decided to use the classification of engaged/disengaged in the experiment.

| 2 | There was quite a range of answers to the applied comprehension questions. There were some extreme outliers e.g. £5,200 for the grocery shop question, which, interpreted literally, might lead us to interpret them as saying they expect inflation to increase by a factor of 52 over the next year. Also noticeable was that the mean on the grocery shopping question was substantially higher than with the pay question (£641 compared to £157). The median responses were comparable (£109 and £110 for the shopping and pay questions, respectively), though well above the 'correct' answer of £102 or £103. | We believe the range of responses to this question in the pre-trial in part reflected problems with its phrasing. For example, an answer of £5,200 could reflect 52 (weeks) x £100, meaning that the respondent gave their answer to reflect an annual budget. We thus rephrased the questions to specify the unit of time; 'per week' for the grocery shop question, and 'daily rate' for the pay question. We also decided to use a quantile regression for analysis of the median response to the applied comprehension questions to avoid bias induced by outliers.[16] |

Figure 1: Distribution of respondents on frequency of reading econ/business news (N=124)

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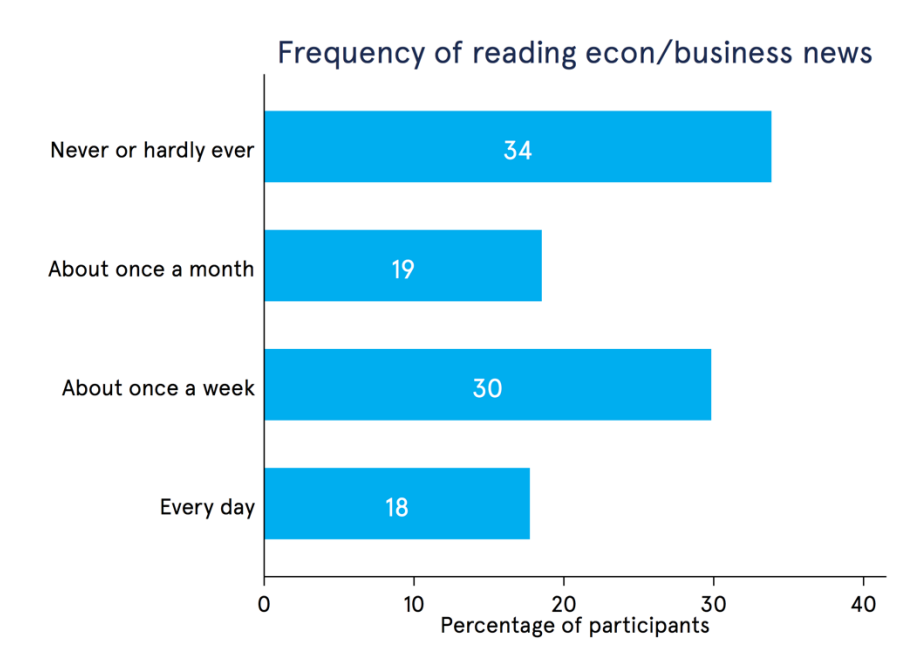
[16] Our pre-defined dependent variable in the applied comprehension questions was a mean difference between the correct answer and answers given by participants. We ran a quantile regression model on the experimental data using that dependent variable. The median responses showed no statistically significant results across different treatments of the experiment. The median scores were 0 in all summaries and means were influenced by outliers. However, when we explored the percentage of correct answers in the applied comprehension questions, we noticed large discrepancies between the groups. Therefore, we decided that a binary variable (correct/incorrect) provides more accurate description of participants' behaviour. This is why we report this in the body of the paper.

Table 2: Distribution of answers on inflation expectation questions

Question	Observations	Mean (standard deviation)	Distribution of answers—percentiles				
			1%	25%	50%	75%	99%
What should they budget for their weekly grocery shop next year?	124	641.4 (1146.8)	15	90	109	127.5	5200
How much should they ask for, to cover increases in the cost of living?	124	156.5 (467.7)	0	45	110	120	1200

Dropout rates at different stages of the experiment. The y-axis denotes the percentage of total dropouts, not percentage of total participants.
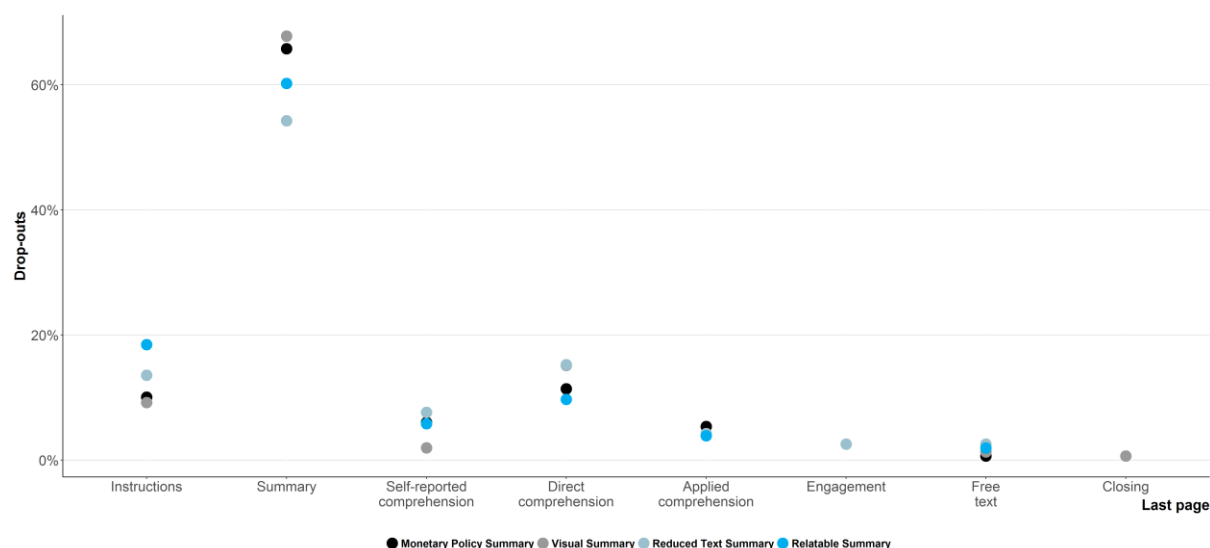
The table below summarises our statistical tests for attrition. The dependent variable is completion, which has a value of 1 when the participant completed the experiment, and 0 otherwise (meaning the participant dropped out). Treatment assignment is our independent variable. Drop-outs before exposure to experimental materials were excluded from the analysis. Models 1 and 2 are OLS specifications with the Monetary Policy Summary and Visual Summary as the controls, respectively. Model 3 is a repeat of model 1 but run as a logistic regression.

Attrition tests

	Dependent variable:		
	Experiment completion (1) vs. dropout (0)		
	OLS		*logistic*
	Monetary Policy Summary	Visual Summary	Monetary Policy Summary
	(1)	(2)	(3)
Visual Summary	0.003		0.016
	(0.020)		(0.135)
Reduced Text Summary	0.042**	0.039**	0.288**
	(0.020)	(0.020)	(0.145)
Relatable Summary	0.081***	0.079***	0.622***
	(0.020)	(0.019)	(0.151)
Constant	0.801***	0.803***	1.390***
	(0.014)	(0.014)	(0.097)
Observations	2,733	2,061	2,733
R^2	0.008	0.008	
Adjusted R^2	0.007	0.007	
Log Likelihood			-1,223.897
Akaike Inf. Crit.			2,455.795
Residual Std. Error	0.372 (df = 2729)	0.363 (df = 2058)	
F Statistic	7.459*** (df = 3; 2729)	8.350*** (df = 2; 2058)	

Note: *p<0.1; **p<0.05; ***p<0.01

Demographic	Sub-group	Population Parameters[17]	Target sample statistic	Realised sample
Age	0-17	21%	N/A	N/A
	18-24 years	9%	30%[18]	27.1%
	25-54 years	41%	45%	45.2%
	55 years and older	29%	25%[19]	27.7%
Income	Household income of £27,499 or lower[20]	50%	50%	49.6%
	Household income of £27,500 or higher	50%	50%	50.4%
Gender	Male	49%	50%	48.2%
	Female	51%	50%	51.8%
Location	North England (NUTS regions of North East England, North West England, Yorkshire and the Humber)	23%	23%	23.8%
	South & East England (NUTS regions of East of England, South East England, South West England)	32%	32%	31.2%
	Midlands (NUTS regions of East Midlands, West Midlands)	16%	16%	17.3%
	London	13%	13%	12.3%
	Scotland	8%	8%	8.1%
	Northern Ireland	3%	3%	3.1%
	Wales	5%	5%	4.3%
Engagement	Engaged (reads economic or business news every day or about once a week)	N/A	N/A	40%
	Disengaged (reads economic or business news about once a month or never or hardly ever)	N/A	N/A	60%
Economics or similar degree	No	N/A	N/A	75.4%
	Yes	N/A	N/A	24.6%

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[17] The population parameters were based on ONS statistics available here.

[18] The 17 and under age group is not present in the panel data so we oversampled the 18-24 group. Our target sample statistic was 30%, the combined size of the 24 and under population in the UK.

[19] Given that older individuals are harder to recruit through online panels, we lowered the target sample statistic for participants aged 55 and older to 25%. Our realised sample was 27.1%, closer to the actual population parameter of 29%. As a result of lowering our target for participants aged 55 and older, we increased our target slightly for the proportion of participants aged 25-54.

[20] According to ONS statistics, the median UK household income is £27,299. However, this exact cut-off did not match the standard income screener used in Predictiv. The household income variable has 24 levels with a median cut-off at £27,499. The panel aggregator advised against using a custom screening for income if we wanted to complete data collection within our scheduled timeframe.

We run balance checks on age, gender, income, location and engagement using Chi-square tests. The results suggest that demographic groups are not significantly different across treatments, which implies that the randomisation was successful (at least on observables). The results from these balance checks are reported in the table below.

Pairwise Fisher's exact test was conducted to calculate pairwise comparisons of covariates across treatment groups (except location which did not have enough observations per cell). P-values were adjusted for multiple comparisons using Hochberg (1988) correction. No statistically significant differences were found when comparing the distribution of covariates in each group to the Monetary Policy Summary.

Demographic	Chi-square result	Pairwise Fisher's test (exact)	Monetary Policy Summary (Control)	Visual Summary	Reduced Text Summary	Relatable Summary
Gender	χ2 (df = 3) = 4.039, p = 0.2573					
Female			266 (49.4%)	296 (52.6%)	273 (50.0%)	343 (54.6%)
Male			272 (50.6%)	267 (47.4%)	273 (50.0%)	285 (45.4%)
		p-values (vs. the Control)		0.306	0.856	0.088
Age category	χ2 (df = 6) = 3.571, p = 0.7345					
18-24			141 (26.2%)	166 (29.5%)	145 (26.6%)	164 (26.1%)
25-54			243 (45.2%)	241 (42.8%)	258 (47.2%)	286 (45.6%)
55+			154 (28.6%)	156 (27.7%)	143 (26.2%)	178 (28.3%)
		p-values (vs. the Control)		0.47	0.65	0.99
Income	χ2 (df = 3) = 0.22282, p = 0.9738					
Below median			269 (50.0%)	287 (51.0%)	272 (49.8%)	319 (50.8%)
Above median			269 (50.0%)	276 (49.0%)	274 (50.2%)	309 (49.2%)
		p-values (vs. the Control)		0.76	1.00	0.81

Location	χ2 (df = 18) = 12.192, p = 0.8372					
London			64 (11.9%)	68 (12.1%)	69 (12.7%)	78 (12.4%)
Midlands			83 (15.4%)	88 (15.6%)	106 (19.4%)	116 (18.5%)
North			131 (24.4%)	138 (24.5%)	125 (22.9%)	147 (23.4%)
Northern Ireland			11 (2.0%)	22 (3.9%)	16 (2.9%)	22 (3.5%)
Scotland			52 (9.7%)	42 (7.5%)	40 (7.3%)	50 (8.0%)
South and East			176 (32.7%)	178 (31.6%)	164 (30.0%)	191 (30.4%)
Wales			21 (3.9%)	27 (4.8%)	26 (4.8%)	24 (3.8%)
		p-values (vs. the Control)		N/A (groups were too small)	N/A	N/A
Engagement	χ2 (df = 3) = 4.153, p = 0.2454					
Engaged			212 (39.4%)	210 (37.3%)	236 (43.2%)	251 (40.0%)
Disengaged			326 (60.6%)	353 (62.7%)	310 (56.8%)	377 (60.0%)
		p-values (vs. the Control)		0.50	0.22	0.86

ANNEX 6   REGRESSIONS USED TO MODEL DIRECT COMPREHENSION SCORES

First regression model

$$Y_i^{comp} = \alpha + \beta_1 T1_i + \beta_2 T2_i + \beta_3 T3_i + \beta_4 A_i + \varepsilon_i$$

where Y_i^{comp} is treated as a continuous variable representing the number of correct answers to the comprehension questions for participant i

$T1_i$ is a binary variable which indicates the treatment for participant i *with a value of 1 if the participant is in the Visual Summary condition and 0 otherwise*

$T2_i$ is a binary variable which indicates the treatment for participant i *with a value of 1 if the participant is in the Reduced Text Summary condition and 0 otherwise*

$T3_i$ is a binary variable which indicates the treatment for participant i *with a value of 1 if the participant is in the Relatability Summary condition and 0 otherwise*

Ai is a vector of controls indicating the gender, age bracket, income bracket, region, and economics engagement level of participant i

α is the regression constant

ε_i *is* the error term

Second regression model

$$Y_i^{comp} = \alpha + \beta_1 T4_i + \beta_2 T5_i + \beta_3 A_i + \varepsilon_i$$

where Y_i^{comp} is treated as a continuous variable representing the number of correct answers to the comprehension questions for the participant i

$T4_i$ is a binary variable which indicates the treatment for participant i *with a value of 1 if the participant is in the Reduced Text Summary condition and 0 if they are either in the Visual Summary or in the Relatability Summary conditions*

$T5_i$ is a binary variable which indicates the treatment for participant i *with a value of 1 if the participant is in the Relatability Summary condition and 0 if they are either in the Visual Summary or Reduced Text Summary conditions*

α, Ai and ε_i defined as in the first regression model.

The table below shows the output of the OLS regressions against two controls: Monetary Policy Summary (left column) and Visual Summary (right column). Robust standard errors are included in parentheses. P-values were adjusted for multiple comparisons using Hochberg's (1988) method.

Comprehension score (0-5)

	Dependent variable:	
	Control	
	Monetary Policy Summary	Visual Summary
	(1)	(2)
Visual Summary	0.506***	
	(0.077)	
Reduced Text Summary	0.610***	0.104
	(0.076)	(0.082)
Relatable Summary	0.827***	0.318***
	(0.076)	(0.082)
Male	0.187***	0.150
	(0.058)	(0.069)
Age 25-54	0.360***	0.426***
	(0.070)	(0.082)
Age 55+	0.986***	1.051***
	(0.076)	(0.090)
Income below median	-0.323***	-0.324***
	(0.056)	(0.067)
Midlands	0.076	0.144
	(0.106)	(0.125)
North	0.131	0.081
	(0.097)	(0.115)
Northern Ireland	0.361	0.460
	(0.198)	(0.224)
Scotland	0.204	0.312
	(0.128)	(0.157)
South and East	0.221	0.227
	(0.094)	(0.111)
Wales	0.166	0.223
	(0.153)	(0.183)
Engaged	-0.118	-0.167
	(0.059)	(0.070)
Constant	1.537***	2.018***
	(0.112)	(0.127)
Observations	2,275	1,737
R^2	0.135	0.108
Adjusted R^2	0.129	0.101
Residual Std. Error	1.333 (df = 2260)	1.383 (df = 1723)
F Statistic	25.128*** (df = 14; 2260)	16.057*** (df = 13; 1723)

Note: *p<0.1; **p<0.05; ***p<0.01

Comprehension score (0-5) across the questions

	Dependent variable:				
	Question 1	Question 2	Question 3	Question 4	Question 5
	(1)	(2)	(3)	(4)	(5)
Visual Summary	0.058**	0.025	0.155***	0.229***	0.037
	(0.029)	(0.030)	(0.028)	(0.026)	(0.030)
Reduced Text Summary	0.102***	0.062**	0.168***	0.249***	0.028
	(0.030)	(0.030)	(0.028)	(0.026)	(0.030)
Relatable Summary	0.106***	0.180***	0.173***	0.323***	0.046
	(0.029)	(0.029)	(0.028)	(0.025)	(0.029)
Male	0.043**	0.026	0.047**	0.014	0.057***
	(0.021)	(0.021)	(0.020)	(0.020)	(0.021)
Age 25-54	0.073***	-0.008	0.155***	0.072***	0.068***
	(0.025)	(0.026)	(0.025)	(0.023)	(0.025)
Age 55+	0.261***	0.048*	0.323***	0.199***	0.154***
	(0.027)	(0.028)	(0.025)	(0.026)	(0.028)
Income below median	-0.057***	-0.011	-0.090***	-0.030	-0.135***
	(0.021)	(0.021)	(0.019)	(0.020)	(0.021)
Midlands	0.012	-0.016	0.010	0.016	0.054
	(0.038)	(0.039)	(0.036)	(0.036)	(0.039)
North	0.006	0.006	0.019	0.027	0.072**
	(0.036)	(0.037)	(0.034)	(0.035)	(0.036)
Northern Ireland	0.048	0.020	0.055	0.086	0.152**
	(0.066)	(0.068)	(0.061)	(0.065)	(0.064)
Scotland	-0.008	-0.005	0.074*	0.058	0.084*
	(0.047)	(0.047)	(0.044)	(0.044)	(0.046)
South and East	0.055	0.002	0.079**	0.023	0.062*
	(0.034)	(0.035)	(0.033)	(0.033)	(0.035)
Wales	0.065	-0.002	0.055	-0.005	0.053
	(0.058)	(0.059)	(0.055)	(0.056)	(0.059)
Engaged	-0.014	0.002	-0.076***	0.004	-0.033
	(0.022)	(0.022)	(0.020)	(0.021)	(0.022)
Constant	0.284***	0.381***	0.373***	0.056	0.444***
	(0.042)	(0.043)	(0.041)	(0.038)	(0.043)
Observations	2,275	2,275	2,275	2,275	2,275
R^2	0.057	0.023	0.106	0.088	0.040
Adjusted R^2	0.051	0.017	0.100	0.083	0.034
Residual Std. Error (df = 2260)	0.486	0.495	0.453	0.462	0.489
F Statistic (df = 14; 2260)	9.733***	3.853***	19.138***	15.670***	6.718***

Note: *p<0.1; **p<0.05; ***p<0.01

Applied comprehension (0-100% correct respondents)

	Dependent variable:	
	Groceries	Salary
	(1)	(2)
Visual Summary	3.287	0.136
	(2.546)	(2.515)
Reduced Text Summary	8.571***	3.992
	(2.635)	(2.582)
Relatable Summary	31.818***	15.099***
	(2.615)	(2.601)
Male	7.182***	3.235*
	(1.918)	(1.885)
Age 25-54	12.249***	10.777***
	(2.141)	(2.021)
Age 55+	33.980***	29.952***
	(2.472)	(2.459)
Income below median	-13.657***	-12.043***
	(1.882)	(1.848)
Midlands	6.325*	6.328*
	(3.388)	(3.269)
North	5.914*	5.064*
	(3.147)	(3.035)
Northern Ireland	10.104	6.921
	(6.227)	(5.973)
Scotland	12.958***	9.070**
	(4.341)	(4.239)
South and East	8.252***	8.046***
	(3.029)	(2.922)
Wales	12.553**	9.546*
	(5.227)	(5.204)
Engaged	-2.374	-1.228
	(1.963)	(1.926)
Constant	7.460**	10.290***
	(3.663)	(3.578)
Observations	2,275	2,275
R^2	0.175	0.105
Adjusted R^2	0.170	0.099
Residual Std. Error (df = 2260)	43.954	43.461
F Statistic (df = 14; 2260)	34.172***	18.858***

Note:	*p<0.1; **p<0.05; ***p<0.01

Self-reported comprehension (1-5)

	Dependent variable:	
	Control	
	Monetary Policy Summary	Visual Summary
	(1)	(2)
Visual Summary	0.508***	
	(0.063)	
Reduced Text Summary	0.682***	0.177***
	(0.064)	(0.063)
Relatable Summary	0.940***	0.431***
	(0.062)	(0.062)
Male	0.210***	0.194***
	(0.046)	(0.053)
Age 25-54	0.220***	0.256***
	(0.056)	(0.064)
Age 55+	0.342***	0.424***
	(0.060)	(0.070)
Income below median	-0.301***	-0.324***
	(0.045)	(0.052)
Midlands	0.075	0.159*
	(0.084)	(0.095)
North	0.132*	0.180**
	(0.080)	(0.091)
Northern Ireland	-0.089	-0.071
	(0.161)	(0.175)
Scotland	0.007	0.152
	(0.098)	(0.114)
South and East	0.035	0.163*
	(0.075)	(0.086)
Wales	0.123	0.253*
	(0.127)	(0.145)
Engaged	0.434***	0.389***
	(0.047)	(0.054)
Constant	2.422***	2.845***
	(0.092)	(0.099)
Observations	2,275	1,737
R^2	0.175	0.121
Adjusted R^2	0.170	0.114
Residual Std. Error	1.051 (df = 2260)	1.056 (df = 1723)
F Statistic	34.253*** (df = 14; 2260)	18.230*** (df = 13; 1723)

Note: *p<0.1; **p<0.05; ***p<0.01

ANNEX 11

11.1 THE IMPACT OF DIFFERENT SUMMARIES AND STUDYING ECONOMICS ON COMPREHENSION SCORE

Comprehension score (0-5) - education added

Dependent variable:

	Control	
	Monetary Policy Summary	Visual Summary
	(1)	(2)
Visual Summary	0.506***	
	(0.077)	
Reduced Text Summary	0.612***	0.106
	(0.076)	(0.082)
Relatable Summary	0.827***	0.318***
	(0.076)	(0.082)
Male	0.191***	0.153**
	(0.058)	(0.069)
Age 25-54	0.353***	0.419***
	(0.070)	(0.083)
Age 55+	0.977***	1.042***
	(0.077)	(0.092)
Income below median	-0.325***	-0.325***
	(0.057)	(0.067)
Midlands	0.071	0.139
	(0.106)	(0.125)
North	0.123	0.075
	(0.098)	(0.115)
Northern Ireland	0.353*	0.452**
	(0.199)	(0.226)
Scotland	0.194	0.305*
	(0.128)	(0.157)
South and East	0.214**	0.220**
	(0.094)	(0.112)
Wales	0.159	0.215
	(0.153)	(0.183)
Engaged	-0.104*	-0.155**
	(0.061)	(0.073)
Economic education - Yes	-0.061	-0.054
	(0.070)	(0.082)
Constant	1.557***	2.037***
	(0.115)	(0.131)
Observations	2,275	1,737
R^2	0.135	0.108
Adjusted R^2	0.129	0.101
Residual Std. Error	1.333 (df = 2259)	1.383 (df = 1722)
F Statistic	23.503*** (df = 15; 2259)	14.936*** (df = 14; 1722)

Note: *p<0.1; **p<0.05; ***p<0.01

Comprehension score (0-5) - engagement by summary

	Dependent variable:	
	Control	
	Monetary Policy Summary	Visual Summary
	(1)	(2)
Visual Summary	0.568***	
	(0.077)	
Reduced Text Summary	0.697***	0.129
	(0.076)	(0.082)
Relatable Summary	0.989***	0.419***
	(0.076)	(0.082)
Male	0.186***	0.144**
	(0.058)	(0.069)
Age 25-54	0.363***	0.426***
	(0.070)	(0.083)
Age 55+	0.987***	1.048***
	(0.077)	(0.092)
Income below median	-0.321***	-0.322***
	(0.057)	(0.067)
Midlands	0.075	0.139
	(0.106)	(0.125)
North	0.132	0.079
	(0.098)	(0.115)
Northern Ireland	0.376*	0.457**
	(0.199)	(0.226)
Scotland	0.205	0.316**
	(0.128)	(0.157)
South and East	0.223**	0.225**
	(0.094)	(0.112)
Wales	0.175	0.231
	(0.153)	(0.183)
Engaged	0.088	-0.048
	(0.061)	(0.073)
Visual Summary - Engaged	-0.157**	
	(0.070)	
Reduced Text Summary - Engaged	-0.220	-0.073
		(0.082)
Relatable Summary - Engaged	-0.408	-0.260
Constant	1.453***	1.978***
	(0.115)	(0.131)
Observations	2,275	1,737
R^2	0.137	0.109
Adjusted R^2	0.131	0.102
Residual Std. Error	1.332 (df = 2257)	1.383 (df = 1721)
F Statistic	21.123*** (df = 17; 2257)	14.100*** (df = 15; 1721)

Note: *p<0.1; **p<0.05; ***p<0.01

11.3 REGRESSION RESULTS EXPLORING THE LINK BETWEEN EDUCATION AND COMPREHENSION IN ACROSS DIFFERENT SUMMARIES

Comprehension score (0-5) - education and summary interaction

	Dependent variable:	
	Control	
	Monetary Policy Summary	Visual Summary
	(1)	(2)
Visual Summary	0.458***	
	(0.087)	
Reduced Text Summary	0.641***	0.183*
	(0.090)	(0.096)
Relatable Summary	0.925***	0.466***
	(0.086)	(0.093)
Economic education (Yes)	0.035	0.276**
	(0.121)	(0.140)
Male	0.192***	0.155**
	(0.058)	(0.069)
Age 25-54	0.350***	0.416***
	(0.070)	(0.083)
Age 55+	0.975***	1.040***
	(0.076)	(0.091)
Income below median	-0.322***	-0.323***
	(0.057)	(0.067)
Midlands	0.072	0.140
	(0.107)	(0.126)
North	0.125	0.075
	(0.098)	(0.116)
Northern Ireland	0.358*	0.459**
	(0.196)	(0.222)
Scotland	0.206	0.318**
	(0.129)	(0.157)
South and East	0.218**	0.227**
	(0.094)	(0.112)
Wales	0.169	0.231
	(0.153)	(0.184)
Engaged	-0.108*	-0.160**
	(0.061)	(0.073)
Visual Summary - Economic education (Yes)	0.202	
	(0.181)	
Reduced Text Summary - Economic education (Yes)	-0.116	-0.323*
	(0.171)	(0.184)
Relatable Summary - Economic education (Yes)	-0.427**	-0.636***
	(0.183)	(0.196)
Constant	1.533***	1.956***
	(0.117)	(0.132)
Observations	2,275	1,737
R^2	0.140	0.114
Adjusted R^2	0.133	0.106
Residual Std. Error	1.330 (df = 2256)	1.379 (df = 1720)
F Statistic	20.358*** (df = 18; 2256)	13.840*** (df = 16; 1720)

Note: *p<0.1; **p<0.05; ***p<0.01

Trust score (0-10)

	Dependent variable:	
	Control	
	Monetary Policy Summary	Visual Summary
	(1)	(2)
Visual Summary	0.240*	
	(0.132)	
Reduced Text Summary	0.215*	-0.022
	(0.128)	(0.127)
Relatable Summary	0.304**	0.060
	(0.130)	(0.128)
Male	0.171*	0.036
	(0.096)	(0.110)
Age 25-54	0.305***	0.314**
	(0.110)	(0.125)
Age 55+	0.880***	0.925***
	(0.124)	(0.141)
Income below median	-0.398***	-0.420***
	(0.092)	(0.105)
Midlands	0.347**	0.433**
	(0.175)	(0.194)
North	0.184	0.197
	(0.164)	(0.187)
Northern Ireland	0.545*	0.504
	(0.314)	(0.345)
Scotland	-0.071	-0.027
	(0.211)	(0.239)
South and East	0.269*	0.336*
	(0.158)	(0.177)
Wales	-0.132	0.018
	(0.266)	(0.303)
Engaged	0.099	0.079
	(0.096)	(0.110)
Constant	5.918***	6.178***
	(0.187)	(0.196)
Observations	2,275	1,737
R^2	0.042	0.043
Adjusted R^2	0.036	0.036
Residual Std. Error	2.151 (df = 2260)	2.141 (df = 1723)
F Statistic	7.133*** (df = 14; 2260)	5.949*** (df = 13; 1723)

Note: *p<0.1; **p<0.05; ***p<0.01

ANNEX 13 THE IMPACT OF DIFFERENT SUMMARIES ON PERCEPTIONS OF THE BANK OF ENGLAND

Perceptions of the Bank of England (1-5)

	Dependent variable:	
	Control	
	Monetary Policy Summary	Visual Summary
	(1)	(2)
Visual Summary	0.142***	
	(0.048)	
Reduced Text Summary	0.207***	0.065
	(0.046)	(0.049)
Relatable Summary	0.277***	0.134***
	(0.046)	(0.049)
Male	-0.004	-0.016
	(0.035)	(0.041)
Age 25-54	0.143***	0.123**
	(0.043)	(0.050)
Age 55+	0.240***	0.211***
	(0.045)	(0.053)
Income below median	-0.078**	-0.084**
	(0.034)	(0.040)
Midlands	0.001	0.035
	(0.064)	(0.073)
North	-0.060	-0.044
	(0.063)	(0.072)
Northern Ireland	0.117	0.108
	(0.104)	(0.116)
Scotland	0.071	0.099
	(0.076)	(0.088)
South and East	0.047	0.046
	(0.059)	(0.068)
Wales	-0.036	-0.086
	(0.100)	(0.111)
Engaged	0.100***	0.081*
	(0.037)	(0.044)
Constant	2.776***	2.942***
	(0.069)	(0.077)
Observations	2,275	1,737
R^2	0.039	0.024
Adjusted R^2	0.033	0.016
Residual Std. Error	0.797 (df = 2260)	0.815 (df = 1723)
F Statistic	6.485*** (df = 14; 2260)	3.238*** (df = 13; 1723)

Note: *p<0.1; **p<0.05; ***p<0.01