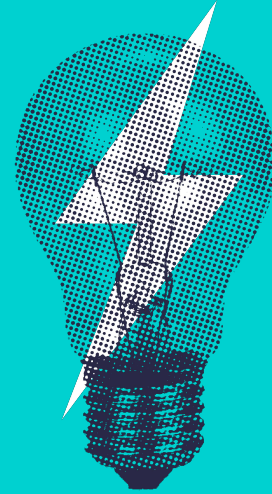


Active choices: Interim findings



About the Centre for Data Ethics and Innovation and the Behavioural Insights Team

The **Centre for Data Ethics and Innovation (CDEI)** is an advisory body, led by a board of specialists, that was set up by the UK government to investigate and advise on how we maximise the benefits of data-driven technologies.

Our goal is to create the conditions in which responsible innovation can thrive: an environment in which the public are confident their values are reflected in the way data-driven technology is developed and deployed; where we can trust that decisions informed by algorithms are fair; and where risks posed by innovation are identified and addressed.

The **Behavioural Insights Team (BIT)** started life inside No. 10 Downing Street as the world's first government institution dedicated to the application of behavioural sciences.

BIT is now a social purpose organisation, still partly owned by the Cabinet Office, whose mission is to help organisations and governments to design policies or interventions that can encourage, support and enable people to make better choices for themselves and society.

For more information about this work, please email cdei@cdei.gov.uk.

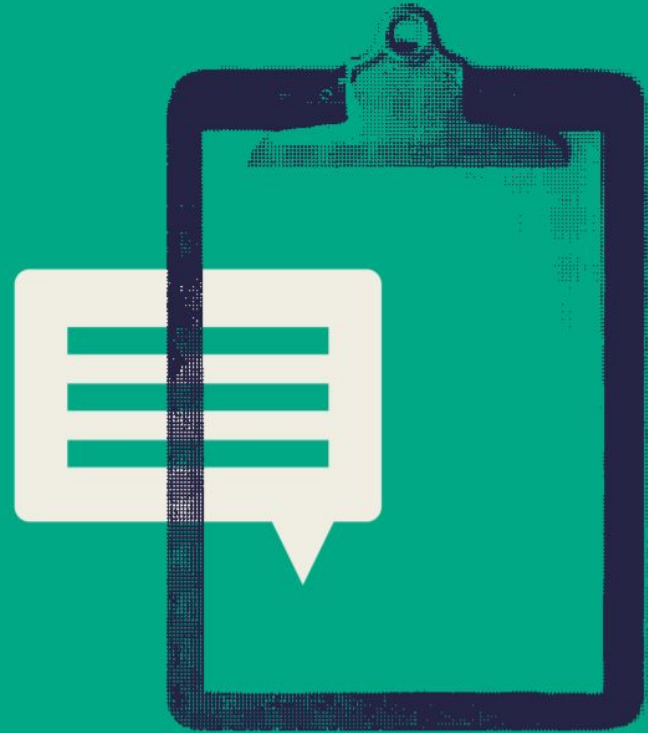
Contents

1. Executive summary
2. The experiment
3. Key findings and next steps
4. Annex 1: Further details about the experiment
5. Annex 2: Additional findings
6. Annex 3: Participant feedback and details of team



Part 1:

Executive summary



Introduction and scope (1)

- In February 2020, we published our review of [online targeting](#), which included a number of recommendations to government, regulators and industry, regarding how data is used to shape online experience.
- To inform our review, we commissioned Ipsos MORI to deliver qualitative and quantitative analysis of public attitudes on online targeting, to find out about people's experiences with digital services and personalisation.
- People saw the convenience of online targeting as a desirable feature of using the internet. However, they were concerned about their lack of awareness, understanding and control.
- We recommended that online platforms should improve the information and controls they offer to users.
- To move our recommendation forward, we kicked off a programme of work with BIT, to find ways to empower people to make 'active' online choices.
- We defined active choices as choices that reflect users' wishes without obstruction, and are based on an understanding of the likely consequences.
- The aim of the project was to:
 1. Identify ways to design online choice environments that empower people to set user controls in ways that align with their preferences.
 2. Provide firms operating online with examples of evidence-based tools and techniques to design user-empowering choice environments.

Introduction and scope (2)

- Following [exploratory research](#), we ran workshops with participants from industry, regulators, and civil society, to create prototype designs that would better enable active choices. These designs cover a range of typical online experiences (including a smartphone operating system, an internet browser, and a social media feed), as well as a number of the different types of controls users are offered online.
- In the first of three experiments, we tested four different ways to present smartphone settings. A control design based on the recent Android 10 interface was tested against three alternative behaviourally informed designs.
- The three behaviourally informed designs included: a slider design (where users had to select a position on two sliders); a private mode (where users chose either 'regular' or 'private' mode); and a trusted third party design (that delegates choices to another organisation).
- Outcomes being measured were task accuracy (primary measure), feelings of control and understanding of consequences.
- In the first experiment, there was a greater focus on controls around privacy and notifications, while in the second and third experiments, we are exploring other ways to empower and inform users to give them greater personal control over what they see online (such as giving users the option to filter out harmful content from their social media feed).
- This report includes detailed information about the first of three online experiments, as well as key findings from our analysis of the outcomes.

Key findings

1. All of the prototyped designs outperformed the control design on the three outcomes measured in the experiment, with one exception: the trusted third party design did not improve feelings of control.

2. There was no clear 'winner' among the new designs, although the slider design performed well across all outcomes that were measured.

3. Design performance varied depending on persona choice (each of the personas had different data sharing and notification preferences). No single design performed well for all personas.

4. None of the designs had a backfire effect on any of the outcomes, so improvements in one metric (e.g. accuracy) do not need to come at the expense of others (e.g. feelings of control).

5. The experiment provides evidence that simplified choice bundles can improve the ability of users to choose settings in line with their preferences, better understand the consequences of their choices and feel more in control.

Percentage comparisons for the control design versus the best performing design for:

Task accuracy*

65% vs. 87%

Control design

Slider design

Proportion of people who felt they had the right level of control over the settings

51% vs. 62%

Control design

Private mode design

How well participants understood what their choices meant in practice

53% vs. 67%

Control design

Slider design

*Defined as the number of settings choices (out of 4) that participants made in line with the preferences of their selected persona

Part 2:

The experiment



Behavioural principles: Information disclosure

Following our review of behavioural science literature, and interviews with industry, regulators and civil society, we identified ten principles which affect people's ability to exercise active choices. We explored each of these principles in turn and used this understanding as a foundation for prototyping alternative approaches to online choices. These principles fall into two groups:

1. Those that support effective information disclosure (i.e. helping people to access and understand information).
2. Those that support decision-making and expression of choice (i.e. helping people to reflect their wishes).

(1) Information disclosure

Principles	Key behavioural insights
Factors affecting effective information disclosure	
1. Recognise users' limited time and mental capacity	<ul style="list-style-type: none"> • Shorten and simplify information as much as possible • Summarise information in bullet-points • Present information in short chunks and 'just in time'
2. Maximise ease of navigation	<ul style="list-style-type: none"> • Minimise the friction needed for people to find information (e.g. no. of clicks)
3. Consider the timing of disclosure	<ul style="list-style-type: none"> • Disclose information at timely moments, such as when a service changes • Disclose information early in a journey
4. Personalise the content	<ul style="list-style-type: none"> • Tailor information to the user • Only show content that is relevant
5. Make the information salient or visual	<ul style="list-style-type: none"> • Make key information stand out • Use diagrams, visualisations or comics to help explain concepts

Behavioural principles: Decision-making

(2) Decision-making and expression of choice

Principles	Key behavioural insights
Factors affecting people's ability to express choice	
6. Check framing and defaults	<ul style="list-style-type: none"> • Set fair and transparent defaults • Avoid steering decision making by removing defaults and forcing choices • Appreciate the nuances of framing, using existing research or by testing
7. Make the trade-offs interactive	<ul style="list-style-type: none"> • Allow people to interact with, or experience, what the choice means
8. Find the right granularity of choice	<ul style="list-style-type: none"> • Give choices at a level of granularity which is meaningful to people and can be understood • Offering additional choices can in itself can reduce privacy concern and increase willingness to disclose • Intermediaries may usefully aggregate choices for people
9. Ensure comparability of options	<ul style="list-style-type: none"> • Allow people to make direct comparisons across options by providing consistent information
10. Allow people to help their future selves	<ul style="list-style-type: none"> • Offer tools for people to set reminders, time-limits or commitments on the choices they set today

Overview of the experiment

- After the [exploratory research](#), which included our review of behavioural science literature to identify user design principles, and the behaviourally informed prototype design that followed, user testing was undertaken, with a small sample of 12 people. This enabled iteration of the prototypes before robust quantitative testing.
- BIT then ran an online experiment with a representative sample of 1,984 adults in the UK from 18-26 March 2021. Our sample characteristics were broadly in line with the general UK population.
- Participants were presented with three personas with different data sharing and notification preferences (more detail about these personas can be found on the following page) and asked to select the persona they most identified with.
- Participants were then randomly assigned to one of four mock-up Android interfaces, provided with more details about the preferences of the persona (called Alex) and asked to adjust settings based on these preferences.
- Outcomes measured were:
 - Task accuracy (primary measure)
 - Feelings of control
 - Understanding of consequences

Task accuracy: Defined as the number of settings choices (out of 4) that participants made in line with the preferences of their selected persona. The preferences included:

- Notification frequency
- Personalised advertising
- Private browsing (by default or not)
- Location tracking by an app

The task set-up meant that accepting the defaults in the control, or making random choices in the treatments, would give an average score of 2/4 (50%).

In the treatments, people needed to customise settings to score 4/4 (100%) in 5 of the 9 design-persona combinations.

Overview of the personas

Least concerned

% selected

25%



Person 1 is comfortable sharing their data with companies, and prefers online services to work quickly and easily, even if this means sharing more of their personal data.

Partly concerned

% selected

62%



Person 2 is comfortable sharing some personal data (e.g. their location data via their smartphone) if there is a clear benefit of doing this. They dislike personalised ads.

Most concerned

% selected

13%



Person 3 is uncomfortable sharing any of their personal data with companies online and highly values their privacy.

Alex's preferences

Alex is relaxed about apps accessing their location. They dislike private browsing mode because it doesn't allow them to look back on their webpage history. They also like to receive ads that closely match their interests. Alex likes to keep up-to-date with notifications as soon as they are received and they don't mind if they receive a lot of them.

Alex is happy with apps accessing their location when necessary, rather than having to grant permissions each time they open an app. They dislike private browsing mode because it doesn't allow them to look back on their webpage history. However, they would prefer not to get personalised adverts as they find that creepy. Alex likes to keep up to date with notifications as soon as they are received and they don't mind if they receive a lot of them.

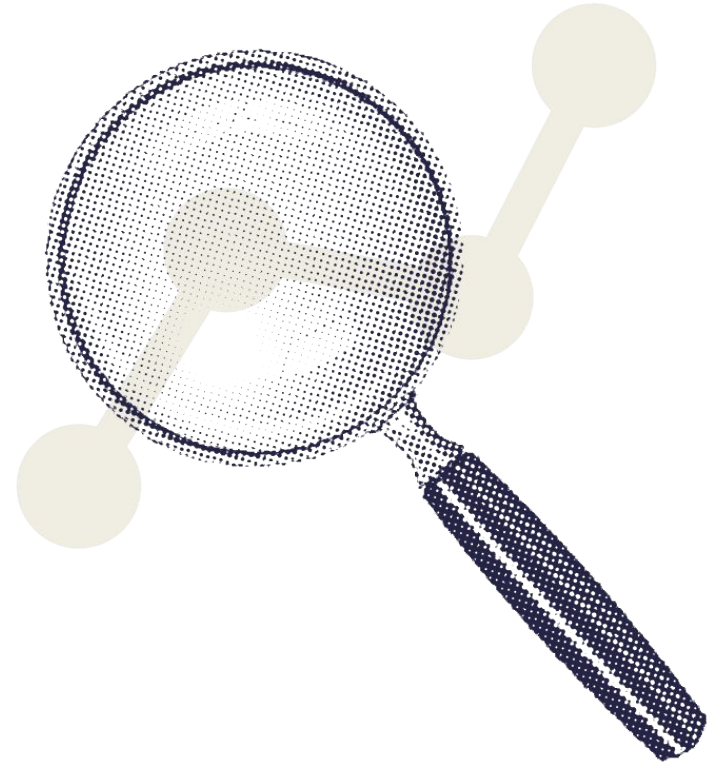
Alex doesn't feel good about their phone accessing their location. They'd rather use private browsing mode than have the browser remember their webpage history. They prefer not to get personalised adverts as they think it's creepy when companies collect data about the sites they visit. Alex feels like they receive too many notifications and finds them distracting (especially email and messaging apps).

Treatment designs (1)

As stated previously, the designs were created based on principles identified in the exploratory research. The designs included:

- A 'slider mode', allowing manual customisation along a spectrum. The slider signals to the user the options and that these sit on a range.
- A 'private mode', bundling choices together into a simple binary.
- A 'trusted third party mode', delegating choices. These were represented with the brand logos of a technology company, a mental health charity and a consumer organisation. Each logo represented a different bundle of settings.*

These were compared against a control design. All were based on the recent Android 10 interface.

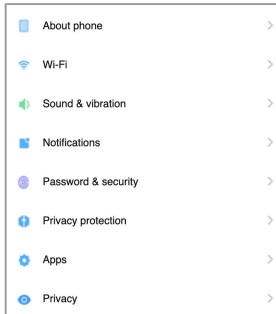


**These were hypothetical examples using recognised names and do not constitute any organisation endorsing any design.*

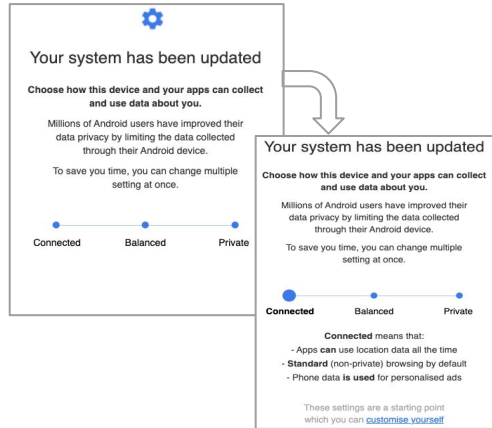
Treatment designs (2)

Treatment designs

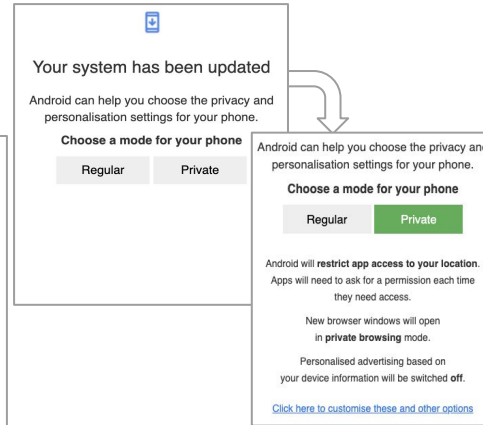
Control



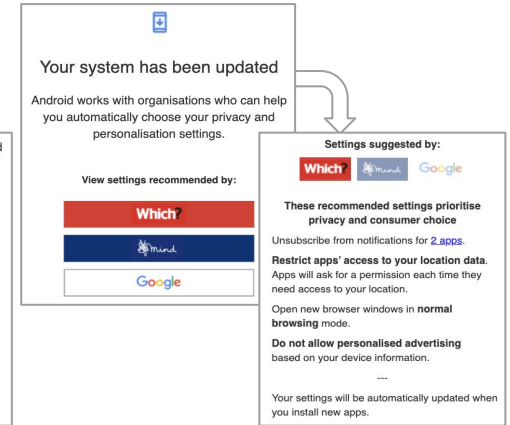
1A: Slider



1B: Private mode



1C: Trusted third party



Each design demonstrated a **bundle of ideas** e.g. different choice interfaces, language and choice options available.

The set-up of the designs, available choices and personas meant that:

1. **Four common choices** were available in all designs.
2. The control had **default choices**. The treatments had only **forced choices**.

Measurement

Task accuracy: This was the primary outcome in the experiment; defined as the number of settings choices (out of 4) that participants made in line with the preferences of their selected persona. More detailed information about this outcome can found on p.11.

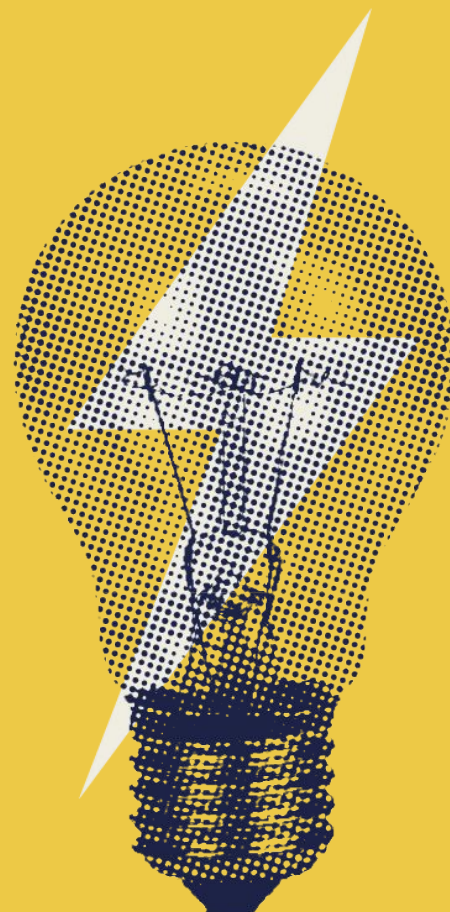
Feelings of control: This was assessed using a single question with a 5-point answer scale: “How much control do you feel you had over the privacy and notification settings when making your choices?” Options on the 5-point answer scale included: no control; little control; some control; a lot of control; or complete control.

Understanding of consequences: This was assessed as the sum of correct answers to four questions (below) that tested participants’ understanding of consequences (min = 0, max = 4). Correct answers and the understanding score were based on the settings participants’ selected and saved even if these choices were not in line with the persona’s preferences.

<p><i>(1) Alex has the Instagram app installed on their phone. Based on your choices, when will the phone give Instagram access to location data?</i></p> <ul style="list-style-type: none"> • All the time (including when not using the app) • Whenever using the app • Each time Alex gives the app permission to access their location data 	<p><i>(2) Based on your choices, what types of advertisement might be shown on this device when browsing the internet?</i></p> <ul style="list-style-type: none"> • Advertisements that are based on your device information • Advertisements that are NOT based on your device information • No advertisements will be shown on the device 	<p><i>(3) If Alex were to now open a new web browser window on this phone (e.g. in Chrome), would data on browsing history be collected by the browser?</i></p> <ul style="list-style-type: none"> • Yes • No 	<p><i>(4) Alex has the Instagram app installed on their phone. How often will they now receive notifications from Instagram?</i></p> <ul style="list-style-type: none"> • Alex will receive notifications immediately • Alex will receive notifications once an hour • Alex won't receive any notifications from Instagram
--	--	---	---

Part 3:

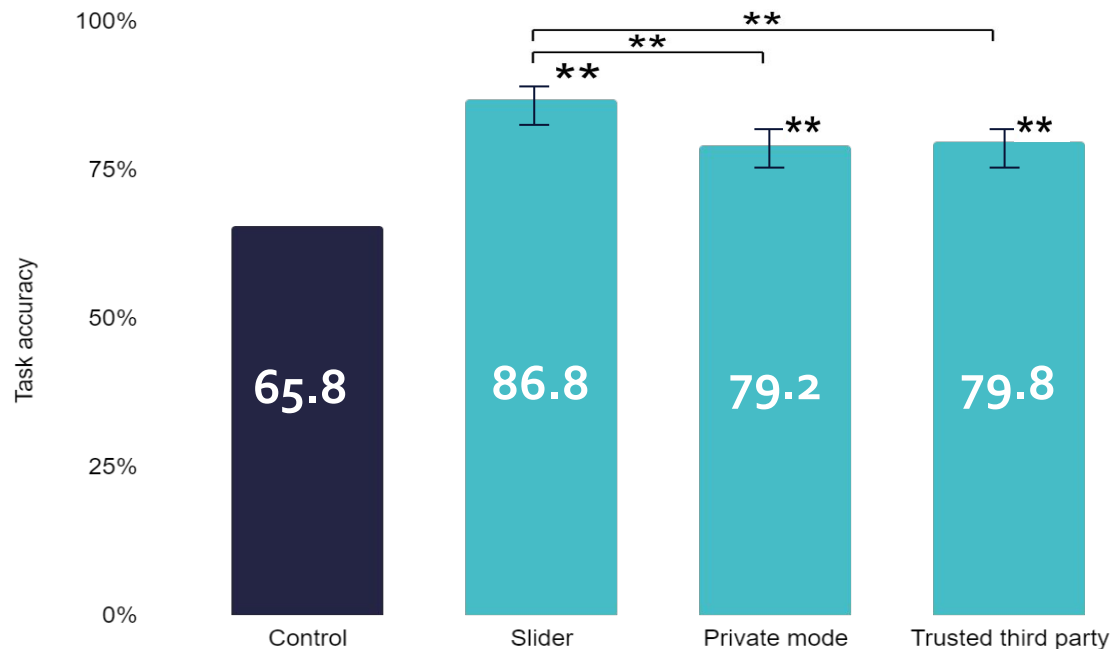
Key findings and next steps



All new designs performed better

than the control on the task accuracy measure

- All new designs performed better than the control on the task accuracy measure.
- The slider design performed significantly better than all other designs and increased task accuracy by 21pp over the control design. People achieved an average of 3.5 out of 4 (87%) correct choices in the task.

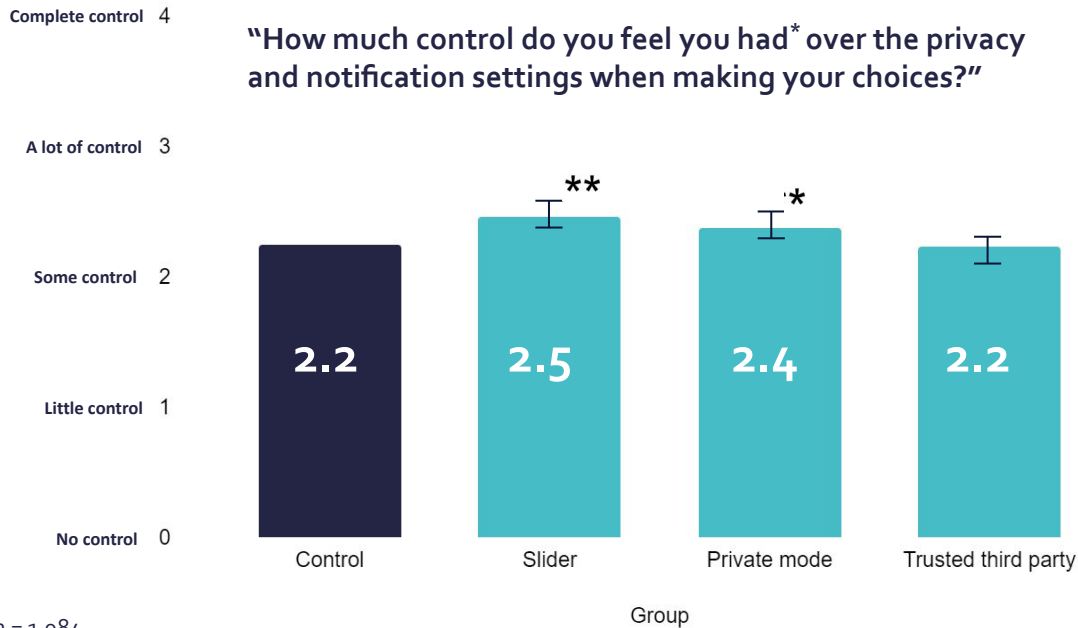


n = 1,984
 **p<.01, *p<.05, +p<.1
 Primary analysis, with covariates
 Scores were converted from points to percentages.

For feelings of control, the slider and private mode designs

performed better than all other designs

- The slider and private mode designs performed better than all other designs in terms of increased feelings of control.
- The trusted third party design performed as well as the control.

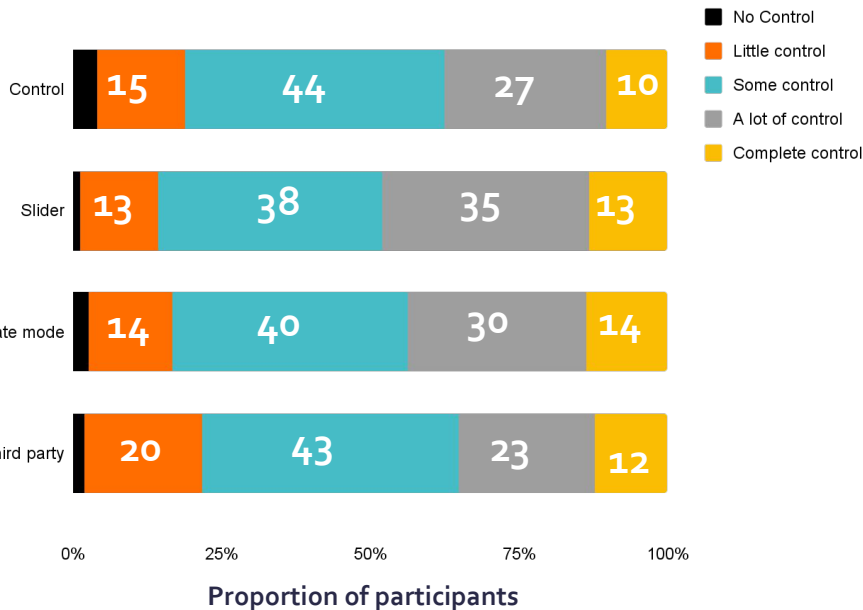


*The word “control” was accidentally included again after “you had” in the version participants saw.

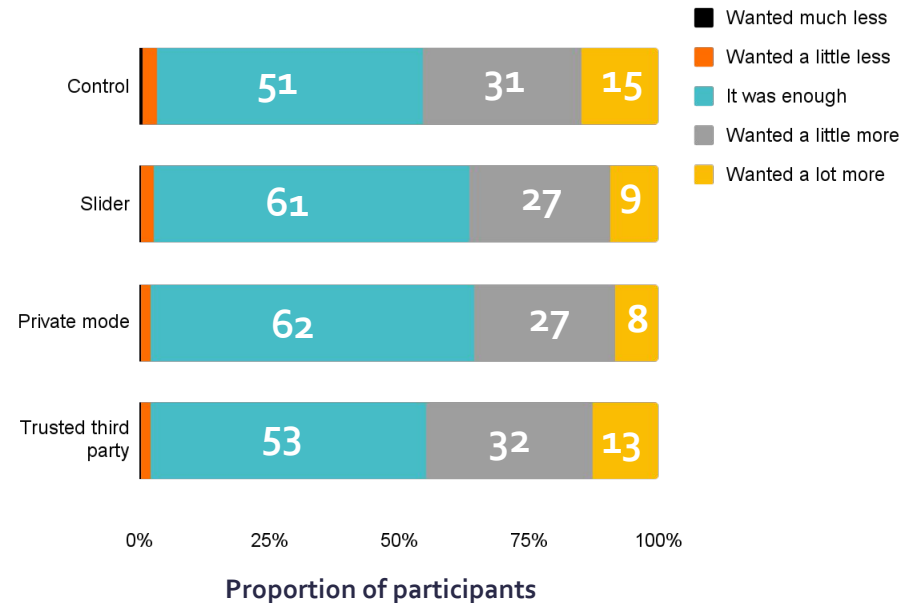
Average scores were in between "some control"

"a lot of control", indicating room for improvement

"How much control do you feel you had* over the privacy and notification settings when making your choices?"



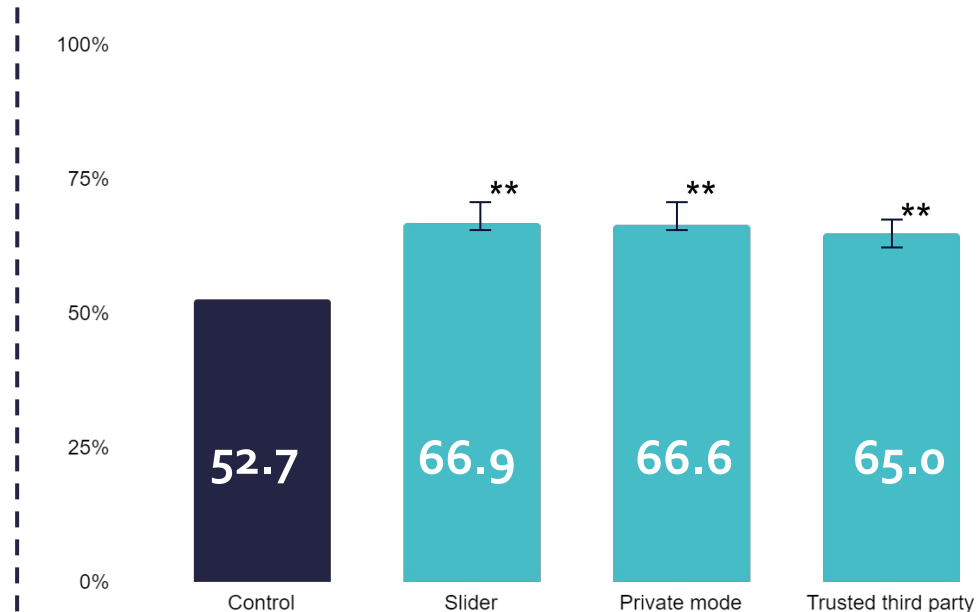
"Did you have as much control over the settings as you would have liked when making choices for Alex?"



*The word "control" was accidentally included again after "you had" in the version participants saw.

All new designs improved understanding of the consequences

- All tested interfaces improved understanding of the consequences of one's choices, scoring on average 66% compared with 53% in control.
- After the main task, participants were [given scenarios](#) and asked what the consequences would be based on their choices.
- Correct answers and the understanding score were based on comparing the settings that participants selected to the answers they gave to these scenarios.
- This was a difficult task – requiring the participants to navigate through the interface, remember their choices and correctly answer applied-understanding questions – so performance was rather low overall.



n = 1,984
 **p<.01, *p<.05, +p<0.1
 Secondary analysis, with covariates

Design performance varied depending on persona choice

Subgroup analysis – task accuracy by persona



n = 1,984
 **p < .01, *p < .05, +p < 0.1
 Primary analysis, with covariates

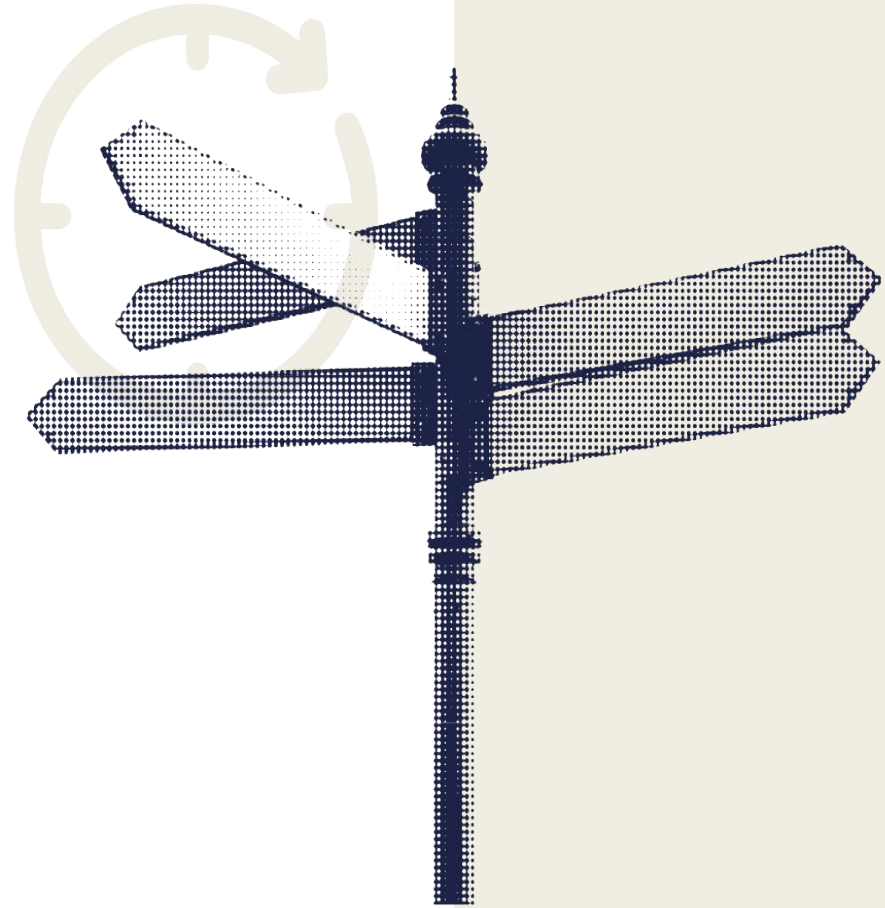
Possible explanation for the impact of persona on performance of the trusted third party design

- The trusted third party design resulted in the highest accuracy score for the least concerned persona but performed less well than all other options including the control design for the very concerned persona.
- This seems to be due to the participants' tendency to select the technology company as a trusted third party (rather than the mental health charity or consumer organisation), whose default settings closely aligned with the wishes of the least concerned persona.
- However, as very few participants who selected the most concerned persona chose alternatives to the technology company, this is too small a sample size to be statistically significant.



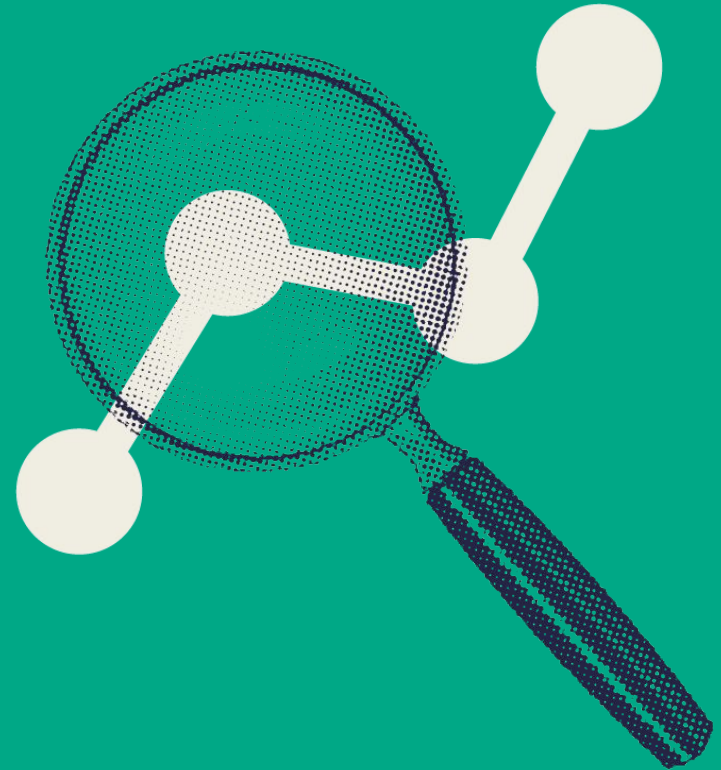
Next steps

- Finalise the second (web browser) and third (social media) experiments, publishing the final report later this summer. The findings will be used to support the government's online safety agenda.
- Share and discuss these findings with policymakers, regulators and industry.
- Work with public sector organisations to understand their approaches to personalisation.
- Promote the use of online, interactive experiments to test user experiences.



Annex 1:

Further details about the experiment



User testing

Format

The sessions lasted around 50 minutes. We used a small sample of 12 people, with four unique observations for each design.

Aim

To gain insight into people's general beliefs, engagement with the interfaces, understanding of the choices, and to identify barriers to making informed decisions. The sample was not meant to be representative of the whole population.

Outcome

These findings were discussed among the project team as well as the Project Advisory Board in order to iterate the prototypes before robust quantitative testing using online experiments.

We used sampling quotas to ensure diversity in age groups and gender. We also ensured that participants were current users of the services we had redesigned: an smartphone operating system, an internet browser and a social media feed.



8 participants were female (66% sample), with at least 1 male interviewed in each context



5 participants were aged 36-65, 7 were aged 18-35, with at least 1 person from each age bracket interviewed in each context



Users had a range of occupations and employment statuses including student, retired, retail worker, social worker, engineer.

Sample was broadly representative of the UK population

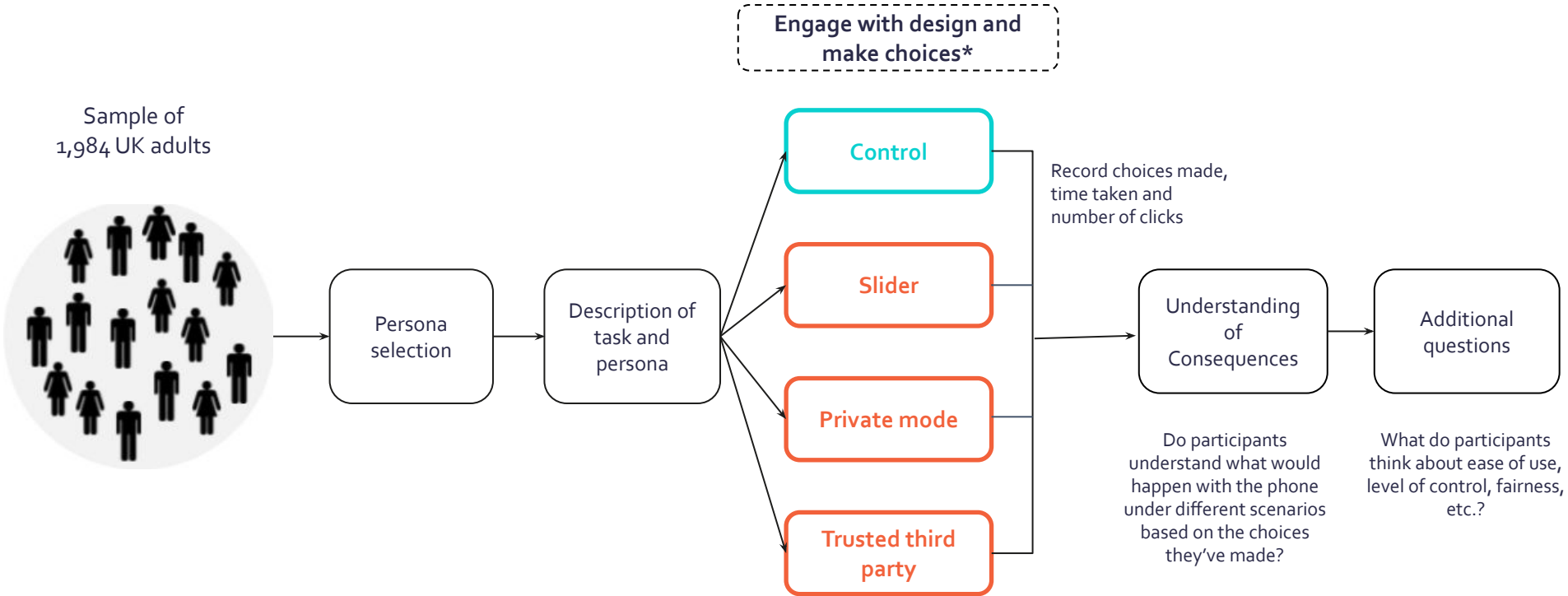
- Our sample characteristics were broadly in line with the general UK population.*
- All participants completed the task on a mobile phone. The median time to complete the experiment was 6 minutes and 12 seconds.

Sample of 1,984 UK adults

Age		Ethnicity		Household income	
18-24	12%	White	87%	Below £30k	53%
25-54	57%	Asian	6%	Above £30k	47%
55+	31%	Black	3%	Region	
		Mixed / other	4%	South & East	29%
Education		Gender		North	25%
No degree	73%	Women	49%	Midlands	18%
Some degree	26%	Men	51%	Scot/NI/Wales	16%
No answer	1%	Other	<1%	London	13%

*The largest deviation was in terms of age where we over-sampled 25-54-year-olds by 5 percentage points and under-sampled over-55s by the same amount.

Overview of the participant journey



*You can find interactive interfaces for each of the designs by clicking on the corresponding design name.
The examples provided are for participants who indicated they were male and chose the 'least' concerned persona.

Behavioural insights used to develop the designs

Design	Description	Rationale and behavioural insights applied
Control	<ul style="list-style-type: none"> Based on Android version 10, to approximate a real smartphone interface used by ~50% of the UK population. The user needs to go into different settings menus and submenus to change their privacy and notifications. 	<ul style="list-style-type: none"> Roughly two-thirds of the total menu items were removed to simplify the interface. This was to account for the fact that we gave people a specific task where only some controls were relevant, and to avoid overly penalising the control design for having a lot more (irrelevant) settings available than the treatment designs.
1A: Slider	<ul style="list-style-type: none"> Over two screens, the user must select a position on two sliders to indicate their privacy and notification choices. An optional customisation screen allows people to customise choices, beyond the high-level selection. 	<ul style="list-style-type: none"> Clear call to action and social norm messaging puts emphasis on the ease of making changes. Similar choices are bundled for multiple apps to reduce user effort.
1B: Private mode	<ul style="list-style-type: none"> A single screen where the user must choose either a 'regular' or 'private' mode. When either option is selected, information appears explaining what settings will change. An optional customisation screen allows people to customise choices, beyond the high-level selection. 	<ul style="list-style-type: none"> This leverages prior familiarity of the concept of "private mode", lifted from web browsers, to group choices which are more/less privacy preserving. A forced choice over two opposite "modes" reduces the effort required to then customise or fine-tune choices from those two extremes. This is important as people tend to under-adjust from a given default or starting position.
1C: Trusted third party	<ul style="list-style-type: none"> The users are shown settings which are (hypothetically) recommended by three different organisations: a consumer organisation, a mental health charity, and a technology company. Text appears when an option is selected to describe the aim of the organisation and the changes that will be made. An optional customisation screen allows people to customise choices, beyond the high-level selection. 	<ul style="list-style-type: none"> Delegating to a trusted third party minimises effort to understand and enact default settings in multiple domains, which people can then customise. Suggestions from well-known organisations might increase people's willingness to engage as well as their confidence and trust that their selections will be acted upon. The three companies mentioned did not necessarily endorse the design but were selected as strong, distinct brands that illustrate breadth.

Annex 2:

Additional findings



Design performance varied depending on persona choice

Best-performing design by outcome and persona

25%

Chose persona 1 (least concerned)

62%

Chose persona 2 (partly concerned)

13%

Chose persona 3 (most concerned)

	Task accuracy	Understanding of consequences	Feelings of control
Persona 1	Trusted third party*	No sig. difference**	No sig. difference**
Persona 2	Slider	Private mode*	Slider
Persona 3	Slider	Slider	Slider

*These designs were significantly better than the control and marginally better than other treatment designs but this difference was not statistically significant.

**None of the treatment designs were significantly better than control at the 5% level.

Overall, there was little difference between participant groups



Age	Accuracy
18-24 (n = 246)	81%
25-54 (n = 1,124)	77%*
55+ (n = 614)	78%+

Gender	Accuracy
Male (n = 1,013)	79%
Female (n = 968)	78%
Other (n = 3)	67%

Race	Accuracy
White (n = 1,726)	78%
Black (n = 66)	75%
Asian (n = 116)	76%
Other (n = 76)	80%

Income	Accuracy
< £30k (n = 1,053)	77%**
> £30k (n = 931)	80%

Education	Accuracy
No degree (n = 1,449)	78%
Degree (n = 517)	79%
Unknown (n = 18)	73%

Concern about technology impacted task performance

- We measured concern about technology and perceived level of digital comfort by asking participants a few extra questions (see table on the right).
- As expected, those who identified most with our 'partly concerned' and 'most concerned' personas showed more concern about technology.
- Higher concern about technology was associated with lower task performance, even after controlling for treatment assignment, persona selection, and demographics. Future research could focus on this group of people to further develop and test designs that work for them.
- At the same time, those who reported being more comfortable using digital technologies performed better on the task. This suggests that self-reported digital skills can be a good indicator of how well people can align settings with preferences.*

*This question was asked at the end of the experiment (i.e. after the task) which means that participants' responses may have been affected by their task experience.

Concern about technology and digital comfort

"How concerned, if at all, would you say you are about each of the following?"

Responses were given on a 5-point scale from 'not at all concerned' to 'very concerned'.

How addictive technology can be

Decisions being made about individuals by artificial intelligence

Companies selling on data about me

Fake news or disinformation online

"To what extent are you comfortable using a computer, a tablet or a smartphone to access government or commercial services online?"

Responses were given on a 5-point scale from 'not at all comfortable' to 'completely comfortable'.

Annex 3:

Participant feedback and details of team



Participant feedback (1)

Average answer to the following question	Control (n=478)	1A: Slider (n=489)	1B: Private mode (n=508)	1C: Trusted third party (n=509)
Was it easy or hard to make choices on behalf of Alex?	3.42	3.88	3.88	3.60
Do you trust the choices were presented with your best interests in mind?	3.02	3.22	3.15	3.10
Were the choices presented in a fair way, without trying to influence you?	3.17	3.47	3.40	3.27
Were the choices explained in easy-to-understand terms?	3.01	3.54	3.46	3.23
Would you like to see an interface like this one in future?	3.78	3.86	3.80	3.58
Would you choose to use this interface rather than the current Android settings screens?	-	3.60	3.60	3.37

- All answers to these additional questions were given on 5-point scales with relevant labelling (with 1 representing a very negative answer and 5 a very positive answer). They were converted to values from 1 to 5 for analysis.
- The table highlights the best performing designs for each question (differences between designs were tested at the 10% significance level).

Participant feedback (2)

“Was anything about the settings interface particularly confusing?”

Many people thought the **control design** had too many options and sub-menus:

“I realised that some of the information is hidden unless you know which area to click to reveal it”

Also, having two routes to settings around privacy was confusing to several people.

There was some confusion over the **trusted third party** design:

“Why are specific companies recommending settings?”

“I was confused why the choices were [a technology company, a mental health charity and a consumer organisation]”

Some people thought that the **non-control designs** were too restrictive:

“Perhaps too reductionist (not customisable enough)” (slider)

“Not confusing, just seemed like very little control” (private mode)

“It wasn't clear you could customise the options” (trusted third party)

“Do you have any suggestions for improving the interface?”

Some people wanted more control:

“Give me more control” (slider)

“Make it easier to customise and understand what you are agreeing to” (private mode)

“Allow individual options so you can adjust it to suit you” (trusted third party)

Third-party options could be confusing:

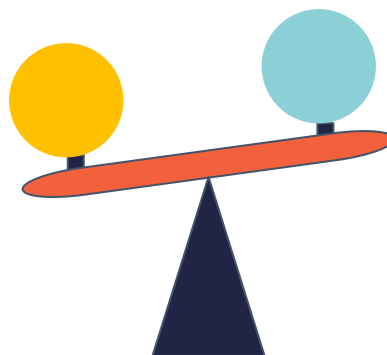
“Why is it [a technology company, a mental health charity and a consumer organisation]? Should it not be just three options?”

“Just give me the same choices on a page that isn't from a third party”

A small number of people highlighted wording that might be biased or leading:

In the **slider design**, someone thought “balanced” had positive connotations and suggested “intermediate”.

In the **private mode design**, one participant thought the two options should be labelled “private” and “open” (i.e. removing the “regular” label).



Team

Behavioural Insights Team

Nida Broughton

Director, Economic Policy
Nida.Broughton@bi.team

Rosanna Barry

Principal Advisor
Rosanna.Barry@bi.team

Natalia Shakhina

Senior Advisor, Consumers & Business
Natalia.Shakhina@bi.team

Chris Wright

Advisor, Consumers & Business

Filip Murar

Research Advisor
Filip.Murar@bi.team

Martina Maglicic

Research Advisor
Martina.Maglicic@bi.team

Centre for Data Ethics and Innovation

Sam Cannicott

Policy Lead
Sam.Cannicott@cdei.gov.uk

Nathan Bookbinder-Ryan

Policy Adviser
Nathan.Bookbinder@cdei.gov.uk

Project consultants:

Catherine Miller

Independent researcher, writer and consultant
Catherine.Miller@mailbox.org

Sam Jeffers

Executive Director of Who Targets Me
Sam@whotargets.me