

Public Understanding of Digital Immortalisation

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Executive Summary

Objectives: This project was designed around a recent staging of a new play, *A Dead Body in Taos*, which explores legal, ethical, moral and psychological themes concerning the digitisation of the self. The public engagement component of this project was to support three activities designed to inform as well as investigate the public's views on topics associated with the digitisation of the self. To this end, there were three public engagement activities, a podcast series (*The Ethics of Digital Immortality and Digital Ethics*), accompanied by a series of carousels (*Social media content providing educational content*), and two workshops (*Women Reclaiming AI workshops*). Alongside these activities was a survey presented to the public probing views on the main theme covered in the play.

Analytic/Methodological Approach: The survey included five key questions (thought about digital immortality, worried about it, likelihood that AI can achieve digital immortality, need for laws to prevent this, changing views if more research is provided) was presented to a population of UK participants (N = 300); this served as a baseline from which to compare against those that has engaged in some way in the public engagement activities, (Fuel website, podcasts/carousels/workshops) (N = 63).

Key Findings: A total of 3,726 members of the public attended the play (across all four sites – London, Bristol, Plymouth, Warwick). There were a total of 248 listens to the podcasts, 70 views of the carousels, approximately 5,000 impressions on Twitter of the podcasts/carousels. For all five questions presented in the survey, the responses from those that had engaged with the public engagement activities increased – that is, they were more worried, more likely to believe it is possible to achieve digital immortality, greater agreements that laws are need to prevent this, and more likely to change their views in general if more research is done in this area.

Conclusions/Recommendations: Given the various ways in which numerous public engagement activities were set up in a short time frame (three months), nonetheless, it appears that they were successful. Overall, the findings suggest that the public can be engaged, they are interested in the topic, and post engagement views on the topic suggest more concern that ought to be addressed through policy interventions, as well as a need for increased effort for researchers to engage with the public on the top of digital immortality.

Author's Note: This project was supported by the Public Engagement Fund Turing Institute (PEFC5\100074), and the work was in collaboration with Fuel Productions, arts producer. *A Dead Body in Taos* is a play that has been co-commissioned by Fuel, Theatre Royal Plymouth and Warwick Arts Centre with support from Bristol Old Vic; *A Dead Body in Taos* is funded by Arts Council England and produced by Fuel.

Artistic Context

Fuel¹ has produced the world premiere of a live stage production of *A Dead Body in Taos* (ADBIT). The playwright is David Farr, and the play has been directed by Rachel Bagshaw. The core story that underpins the play is of a woman who travels to the New Mexico desert to bury her dead mother. She is informed that her mother is being kept in a facility, ‘FutureLife’, a multinational biotech corporation promising digital immortality. She has interactions with the digitally realised version of her mother, and in turn faces the ethical and legal issues that concern the facilitating the continued existence of her mother in artificial form.

ADBIT has been informed by current research on innovations in neuroscience and artificial intelligence. At the heart of the play is an ethical dilemma: upon the death of her mother, a grieving daughter is left with two options: Option 1 halt the grieving process by using an artificial intelligence system that can rebuilds her mother through an algorithm; Option 2 pursue the grieving process, and accept her death.

The drama encourages the audience to consider the potential that artificial intelligence offers for immortality, and ask what it means to be human, and how ethical boundaries might be overstepped in changing the natural order of things through scientific and technological advancements.

The play was toured in four locations, Plymouth Theatre Royal, Wilton’s Music Hall in London, Bristol Old Vic, and Warwick Arts Centre. The play received a range of three to four star ratings from a range of theatre reviewers (FT, Guardian, The Stage, Time Out²).

Scientific Context

Recent work by Nader et al (2022³) primarily focused on the public’s current understanding of artificial intelligence (AI), and how this understanding may be informed by entertainment media. Here, as with other recent survey studies (Dafoe & Zhang 2019⁴; Edelman AI Center of Expertise 2019⁵; Good AI, 2019⁶; Hervieux and Wheatley 2021⁷; Stai et al. 2020⁸; Zhang &

¹ <https://fueltheatre.com/>

² <https://www.ft.com/content/85f05dbb-747c-40a0-976f-996bfe8df938>; <https://theatreweekly.com/fuel-presents-a-dead-body-in-taos-a-new-play-by-david-farr>; <https://www.timeout.com/london/theatre/a-dead-body-in-taos>; https://www.whatsonstage.com/shows/off-west-end-theatre/a-dead-body-in-taos_276817/; <https://www.theguardian.com/stage/2022/oct/21/david-farr-playwright-interview-dead-body-in-taos>

³ Nader, K., Toprac, P., Scott, S., & Baker, S. (2022). Public understanding of artificial intelligence through entertainment media. *AI & society*, 1-14.

⁴ Dafoe A, &, Zhang B (2019) Artificial intelligence: American Attitudes and Trends. Center for the Governance of AI, Future of Humanity Institute, University of Oxford, Oxford. <https://governanceai.github.io/US-Public-Opinion-Report-Jan-2019/>

⁵ Edelman AI Center of Expertise (2019) 2019 Edelman Artificial Intelligence Survey. Edelman. <https://www.edelman.com/research/2019-artificial-intelligence-survey>

⁶ Good AI (2019) Understanding the public perception of AI. GoodAI Blog. <https://medium.com/goodai-news/understanding-the-public-perception-of-ai-a14b0e6b6154>

⁷ Hervieux S, Wheatley A (2021) Perceptions of artificial intelligence: a survey of academic librarians in Canada and the United States. *J Acad Librariansh* 47(1):102270. <https://doi.org/10.1016/j.acalib.2020.102270>

⁸ Stai B, Heller N, McSweeney S, Rickman J, Blake P, Vasdev R, Edgerton Z, Tejpal R, Peterson M, Rosenberg J, Kalapara A, Regmi S, Papanikolopoulos N, Weight C (2020) Public perceptions of artificial intelligence and robotics in medicine. *J Endourol* 34(10):1041–1048. <https://doi.org/10.1089/end.2020.0137>

Dafoe, 2019⁹), the findings suggest that understanding is often shallow, though this is also likely because of the broad ways in which the public is asked to provide their understanding.

Entertainment media often characterises AI in extremes (e.g. *Black Mirror*, *Her*, *I Robot*, *Upload*), either positive or negative, whereas public beliefs are less extreme, and informed by their own experiences of different interactions with technologies (e.g. social media, online gaming).

The findings also indicate that people are generally positively disposed to developing relationships with AI, are optimistic of the applications of AI in day to day life, but are centrally concerned with AI being used to replace human job opportunities, and could have the potential to "take over the world". Much of the work examining public understanding still needs to consider the range of ethical issues that AI poses, and none thus far examine the future possibility of AI to enable a digitally immortal self. Thus, the findings from this project would be a first step to addressing this research gap, and show how efforts to support different forms of public engagement can be used to inform as well as better gauge public views of topics around AI that have direct impact on public life now and into the future.

Motivation for current project

The main objective of this project was to bring together arts and science through a series of public engagement activities. The vehicle for the public engagement was the play *ADBIT*, and the central themes of the public engagement activities were digital immortality and digital ethics. The proposed engagement activities interrogated the science, technology and ethics of digital immortality and digital bodies.

To demystify the issues, this project examined what the technological possibilities are, and what the psychological, social, cultural, legal and ethical boundaries are to achieving digital immortality. To this end, the three public engagement activities were: a series of five podcasts, carousels accompanying the podcasts, and two workshops.

Podcasts: The podcast *The Ethics of Digital Immortality and Digital Ethics*¹⁰ was comprised of five episodes exploring the ethics of digital immortality and digital bodies. Each episode features a Guest Expert who, in conversation with the Host, is invited to unpack “Are Digital Immortality & Digital Bodies Ethical?” and “What Does It Mean To Be Human?”; the latter question was put to all five guest experts to answer at the end of the podcast.

The idea was to dissect the subject matter from their own expertise angle. The podcast was released on Fuel Digital platform and Spotify, and promoted through Fuel’s social media channels (Instagram, 3724 followers; Twitter, 25,000 followers).

Guest speakers encompassed a range of expertise: two behavioural scientists (Magda Osman – decision scientist, Christopher Berry – memory researcher), a computer scientist as well as

⁹ Zhang, B., & Dafoe, A. (2019). Artificial intelligence: American attitudes and trends. Available at SSRN 3312874.

¹⁰ <https://open.spotify.com/show/27ti4cMjQk32FDFbZok4gg>

multidisciplinary artists (Kate Devlin – AI and Human computer interaction, Coral Manton – creative computing, Rachel Bagshaw – the director of the play).

Carousels: The social media learning content took the form of "carousels"¹¹ that synthesized in an accessible and entertaining way the topics of the podcast while also providing educational content. Carousels presented viewers with a series of bold images that across a sequence present a narrative of a topic, combined with short text and that will sign-post and link to relevant academic articles to each carousel.

Workshops: There were two workshops one held in London's British Library, and the other in Warwick Arts Centre referred to as "*Women Reclaiming AI workshops*"¹².

The idea was to provide a space to interrogate the intersection between technology and gender, with a focus on the biases of conversational AI. The interactive sessions were set up in such a way for participants to contribute to the design of an inclusive conversational system, and act as entry points to the field to non-experts and less represented groups. Recruitment for participation for the workshops involved contacting several women's groups (Mothers Who Make Coventry, Spon End Caribbean Centre, Hillfields Wellbeing Group, Coventry Migrant and Refugee Centre).

Surveys: The aim of the survey was to use it as means of gauging the extent to which general views on digital immortality were impacted by exposure to content via the different public engagement activities of this project.

The survey was not designed in a way to probe in depth understanding of the issue itself, or public views around the specifics of the topic and their understanding of what they take digital immortality to mean; these are obvious limitations of the survey.

The survey had to be short, accessible, and easy for a non-academic audience to respond to, which is also why it was styled in a such a superficial way. Therefore, it was not designed in mind of a standard survey design as referred to in the published literature presented in the 'Scientific Content' section in the introduction. Nonetheless, the findings from the survey can be used as a basis on which to develop more detailed and robust questions in a survey to follow up the patterns of findings indicated here.

Public Engagement: findings

The data collection focused on three different aspects: 1) Audience attendance of the play itself, 2) All data regarding podcasts/carousels/workshops, 3) survey responses.

Audience attendance of the play itself: The play was in four locations, with total attendance across all four reaching 3,726 members of the public. How successful or unsuccessful is this?

¹¹ <https://www.instagram.com/fueltheatre/?hl=en>; **Episode 1** - <https://www.instagram.com/p/CjIG07qofpA/> **Episode 2** <https://www.instagram.com/p/Cjpdft9qEZn/> **Episode 3** - <https://www.instagram.com/p/Cj5KneqqxJD/> **Episode 4** https://www.instagram.com/p/CkLG0wHqLo_/ **Episode 5** - <https://www.instagram.com/p/CkfvL8PqY4m/>

¹² <https://www.instagram.com/p/CkdIpBaKrr0/?hl=en>

For new plays, where new plays are produced for small and mid-scale productions, the figures would suggest attendance for performances, and depending on marketing and capacity of the theatre, anything between 30 to 120 audiences per performance¹³. Thirty three performances were staged as part of the tour, with approximately 112 audience members per performance, and at least in one location the theatre was sold out. Based on these findings, the indication is that the play was a success. Moreover, if we consider that the play was on at a time of a cost-of-living crisis, and that theatre attendance overall has been impacted by this and other externalities, then this helps to put in context the success of the play, possibly also because of the theme of the play, and its production.

All data regarding podcasts/carousels/workshops: In total there were five episodes included in the podcasts, and the total number of listeners was 248. Again, it is hard to gauge what the level of success without making reference to other comparable podcasts, of which there are none of this kind, though there are related themed podcasts¹⁴; however, the listenership is not published for it to be possible to determine relative numbers.

By looking at the number of followers of the various podcast sides listed in 2022 top 10, then on Twitter the numbers range between 650 (Eye on AI podcast) to 8,230 (Data Skeptic podcast) followers. For comparison, the total number of impressions on Twitter for the five podcasts was 4,970, number of engagements was 116, 16 retweets, and 19 link clicks.

When it came to the carousel, there were a total of 70 likes from the engagement of the carousels, up to 240 views of the carousels.

There were two workshops, one in London at the British Library and the other at Warwick Arts Centre. The number of attendees in total were 24. Participants outreach was carried out with specific organisations designed to bring in women into the discussion around STEM subjects more broadly, and AI more specifically, with directed discussions around the ethics of AI in the context of digital immortality.¹⁵

Survey responses: The idea of including a short survey into this project was to find ways of gauging some degree of impact of the public engagement activities on general views on digital immortality.

In order to do this, a short five question survey¹⁶ was presented to a sample of respondents via Prolific academic – a crowd sourcing platform for running surveys. The idea here was to establish a baseline of responses to the questions in order to compare to the same survey presented to those that had engaged in the activities of this project.

¹³ These are figures that are estimates and inferred from data presented in 2018 report - <https://uktheatre.org/EasySiteWeb/GatewayLink.aspx?aId=1866980>

¹⁴ <https://podcastle.ai/blog/best-artificial-intelligence-podcasts-of-2022/>

¹⁵ A separate report on the outcome of the workshops and discussions is prepared by the team at Warwick and the lead academics that coordinated and ran the workshops.

¹⁶ <https://www.surveymonkey.co.uk/t/9H2G7QV>

The baseline survey included 300¹⁷ respondents¹⁸. All participants were presented with five key questions presented in Table 1, and graphically presented in Figure 1.

Table 1. Average responses to the five key survey questions by respondent type
(baseline, public engagement)

Question no.	Question	Baseline N = 300	Public Engagement N = 50 ¹⁹
1	How much have you thought about the possibility that you might live forever as an artificial system online? 1 (not at all) – 10 (all the time)	Mean = 2.2 SD ²⁰ = 1.9	Mean = 2.9 SD = 2.4
2	Now that you have been asked, how much are you worried about research that could be used to help us live forever as an artificial system online? 1 (not at all worried) – 10 (extremely worried)	Mean = 3.5 SD = 2.4	Mean = 4.1 SD = 2.8
3	If there is research that could lead us to living forever as an artificial system online, do you think it would actually be possible to live forever? 1 (not at all possible) – 10 (absolutely possible)	Mean = 3.2 SD = 2.4	Mean = 4.8 SD = 3.2
4	If research being used to help us living forever as an artificial system online do you think there should be laws in place to prevent this? 1 (no laws are needed) – 10 (absolutely laws are needed)	Mean = 6.2 SD = 2.7	Mean = 7.2 SD = 3.0
5	If you knew more about research that could lead to ways of living forever as an artificial system online do you think your views would change? 1 (definitely not change) – 10 (definitely would change)	Mean = 4.4 SD = 2.1	Mean = 5.6 SD = 2.3

¹⁷ The following more detailed demographics are as follows, by gender (Female = **200**, Male = **99**, Prefer not to say = **1**) and age group (18-24 = **13**, 25-34 = **88**, 35-44 = **76**, 45-54 = **53**, 55-64 = **46**, 65+ = **24**).

¹⁸ All of the demographic details and detailed breakdown of responses by demographics is presented in the appendix.

¹⁹ While there was a total of 63 participants, 50 indicated that they had responded to the survey after taking part in the public engagement activities.

²⁰ SD = Standard Deviation as an indication of variance in responses.

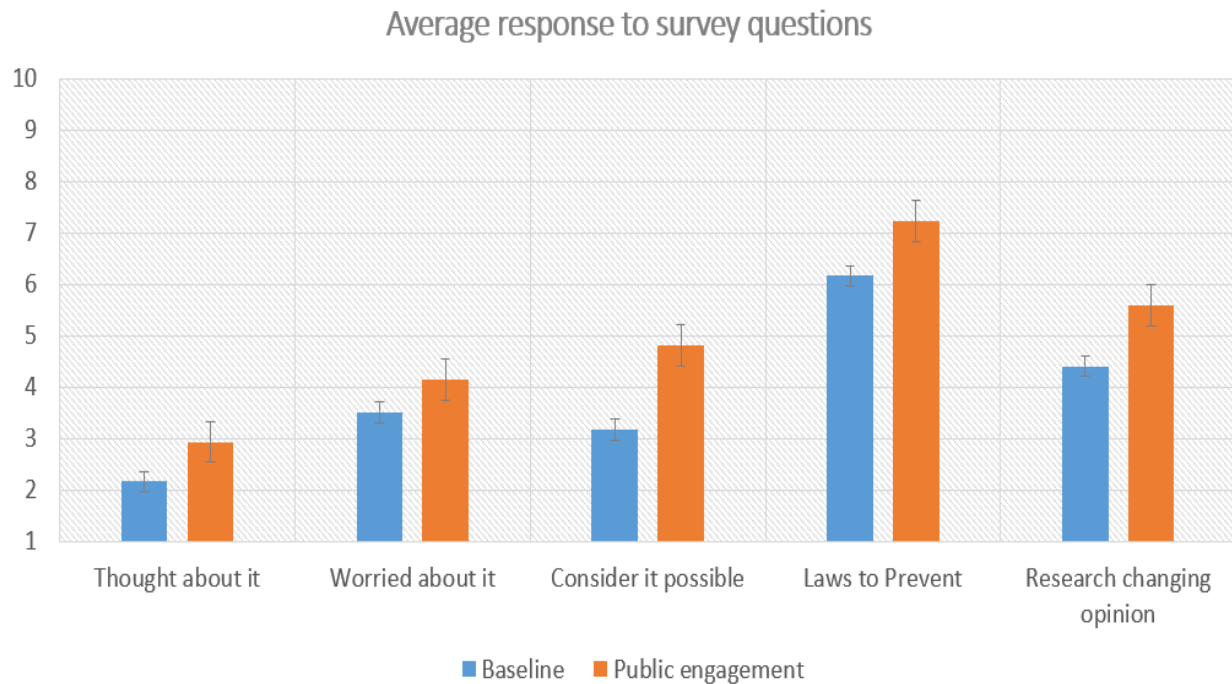


Fig 1. Mean (Standard Error) of responses to the five key survey questions by sample

The same survey was distributed widely, and so a few ($n=13$) responded that had not been exposed to any of the organised public engagement activities. The focus here was on the 50²¹ respondents that had completed the survey after they had experienced at least one of the three public engagement activities, for which the data is presented in Table 1, and graphically presented in Figure 1.

Given that there were differences in the sampling, and the fact that there was an even number of respondents for the two surveys that were run, no inferential statistical tests were performed to run comparison tests between samples. What is clear from the general trend indicated in Figure 1 is that ratings increased from the sample that had been exposed to the various public engagement activities. They had thought about the topic of digital immortality marginally more than the baseline, were more worried about the possibility of digital immortality, considered it more likely that technology could realise it, were more in favour of laws to prevent technology realising it, and would likely consider their opinion malleable in the face of more research that would be communicated to them.

²¹ The following more detailed demographics are as follows, by gender (Female = 29, Male = 17, Prefer not to say = 4) and age group (18-24 = 3, 25-34 = 22, 35-44 = 16, 45-54 = 2, 55-64 = 5, 65+ = 2).

Limitations

The funds for the public engagement activities were approximately £10,000, with the aim of supporting innovative mechanisms to reach a range of audiences. Within approximately three months, three different public engagement activities were set up. The ambitions of this project were high. The aim was to engage a wide and diverse audience that would not have otherwise been invested in listening, reading, or discussing topics associated with digital immortality.

There is difficulty in gathering relevant data to determine how wide ranging and diverse the audiences were – not just for the play itself, but also for the public engagement activities themselves. Given the difficulty, there is no reliable basis on which to claim that the audiences responding to the public engagement activities were diverse, though what diverse refers to can be construed in a variety of ways.

Therefore, this project cannot claim to have engaged in diverse audiences, but what it did was devise mediums by which content around a scientific and technological theme was made accessible beyond the typical forums the academia uses. Also, while it is an assumption, the audiences that are engaged with Fuel, and its productions, are less likely to overlap with audiences engaged in the Turing Institute, for the reason that the arts are featured less in collaborations with the Turing Institute, and vice versa. Therefore, one potential outcome of this project is to foster future collaborations with arts organisations as means of accessing different types of audiences. So long as the medium is engaging, and the themes can be made accessible, there is no reason for different audience to be inspired and curious about the scientific and technical advances that the Turing Institute is engaged in.

Conclusions and Recommendations

This project was designed to bring together science, and technology to the public via the arts. The play *A Dead Body in Taos* centred around the concept of digital immortality. This was used as a vehicle for expanding discussions around this and related themes through different types of public engagement mechanisms. The first was a podcast series, the second was a complement to the podcasts through the use of carousels that made key scientific content creatively accessible through visual representations, and third were two workshops.

The findings from the surveys point to a few aspects that are of relevant to policy and science. From a policy perspective what is also clear is that there was a strong trend in both samples to support for laws to prevent technological advances that could realise digital immortality. From a science and technology perspective, and of particular relevance to the Turing Institute, there are positives to take away from the pattern of responses to the last question of the survey. The question was concerned with the impact of research on changing the opinions of the respondents. Both samples of respondents indicated that having access to research around the topic of digital immortality would be persuasive in changing their views. The point here is that the question indicates that access to research would be useful, and that respondents are willing to have their views changed in light of understanding the topic more.

Public debate should be central to any major technological advancement, because it helps to gauge when science and technology might be overreaching, and what society is willing to tolerate in terms of the ethical boundaries. Artificial intelligence advances in ways that still needs to include the public in discussion, and so this project was designed in to illustrate a few ways in which the public can be engaged, and that this can be influence judgements on a complex topic. This project should be seen as a starting point for considering similar avenues for other related topical issues.

The underlying assumption of this project is that the arts can be used as a vehicle to communicate the implications of advances in information/computer science and technology that involve audiences, rather than alienates them as might be typical of standard lectures or formal addresses from academics. This is still a working assumption, and more investment is needed to explore creative approaches to inspiring interest in from audiences outside of academia. The serves a public good because scientific communication to wide audiences is an important end in itself, but also because an informed public can further policy discussions on issues that affects us now and into the future.

Appendix

The following figures and tables presented in this section provide a break down of the responses to the 5 survey questions according to gender and age break downs.

Gender:

Table 2. Mean and standard deviation of ratings for the 5 main survey questions by gender, by sample

Q no.	Question	Baseline N = 300		Public Engagement N = 50	
		M = 99	F = 200	M = 17	F = 29
1	How much have you thought about the possibility that you might live forever as an artificial system online? 1 (not at all) – 10 (all the time)	Mean = 1.9 SD = 2.4	Mean= 1.6 SD = 2.1	Mean= 3.3 SD = 2.4	Mean= 2.6 SD = 2.5
2	Now that you have been asked, how much are you worried about research that could be used to help us live forever as an artificial system online? 1 (not at all worried) – 10 (extremely worried)	Mean = 2.9 SD = 2.6	Mean= 3.5 SD = 2.6	Mean= 3.4 SD = 2.7	Mean= 4.7 SD = 2.8
3	If there is research that could lead us to living forever as an artificial system online, do you think it would actually be possible to live forever? 1 (not at all possible) – 10 (absolutely possible)	Mean = 3.3 SD = 2.9	Mean= 2.8 SD = 2.5	Mean= 5.2 SD = 3.3	Mean= 4.4 SD = 3.3
4	If research being used to help us living forever as an artificial system online do you think there should be laws in place to prevent this? 1 (no laws are needed) – 10 (absolutely laws are needed)	Mean = 5.6 SD = 2.9	Mean= 6.4 SD = 2.6	Mean= 5.5 SD = 3.6	Mean= 7.8 SD = 2.3
5	If you knew more about research that could lead to ways of living forever as an artificial system online do you think your views would change? 1 (definitely not change) – 10 (definitely would change)	Mean = 4.5 SD = 2.5	Mean= 4.2 SD = 2.2	Mean= 5.2 SD = 2.2	Mean= 5.7 SD = 2.5

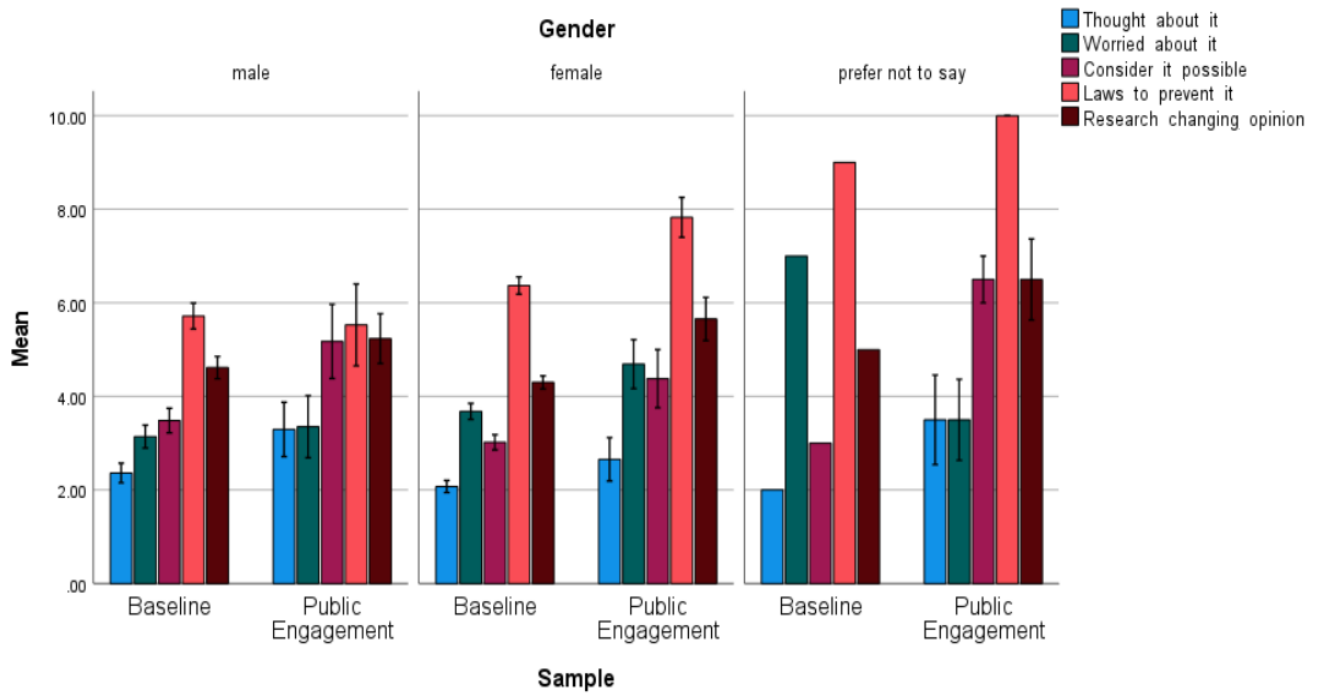


Fig 2. Mean (Standard Error) of responses to the five key survey questions by gender, and by sample

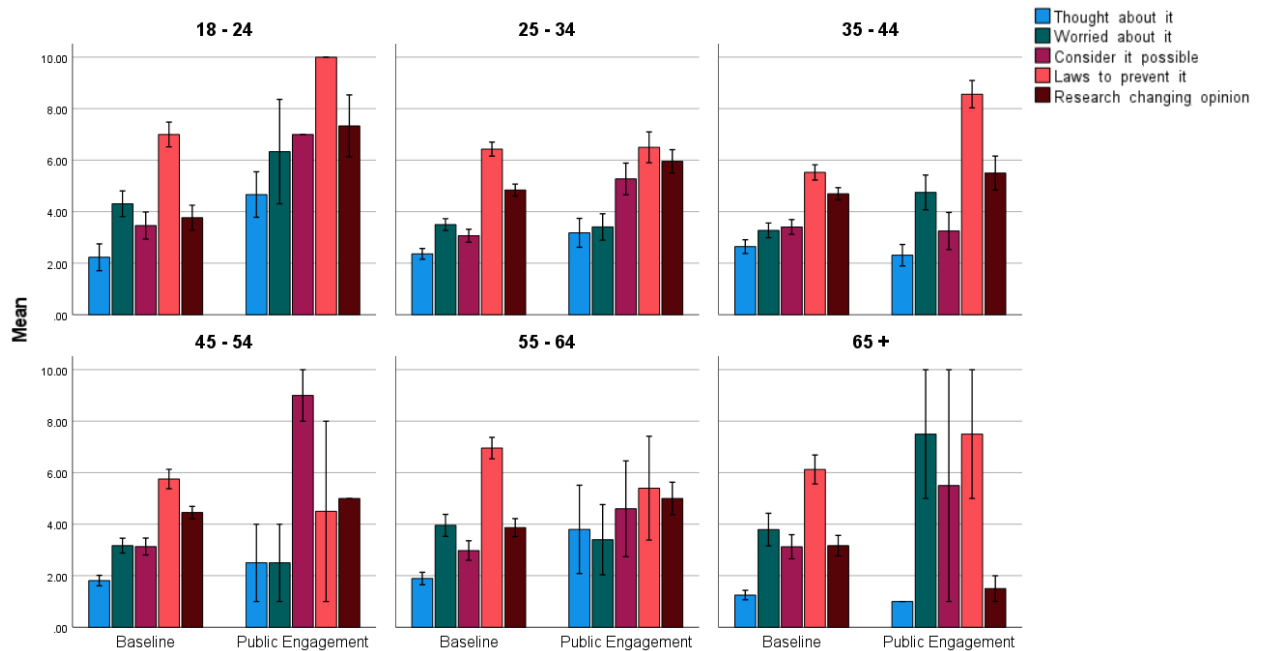


Fig 3. Mean (Standard Error) of responses to the five key survey questions by age, and by sample