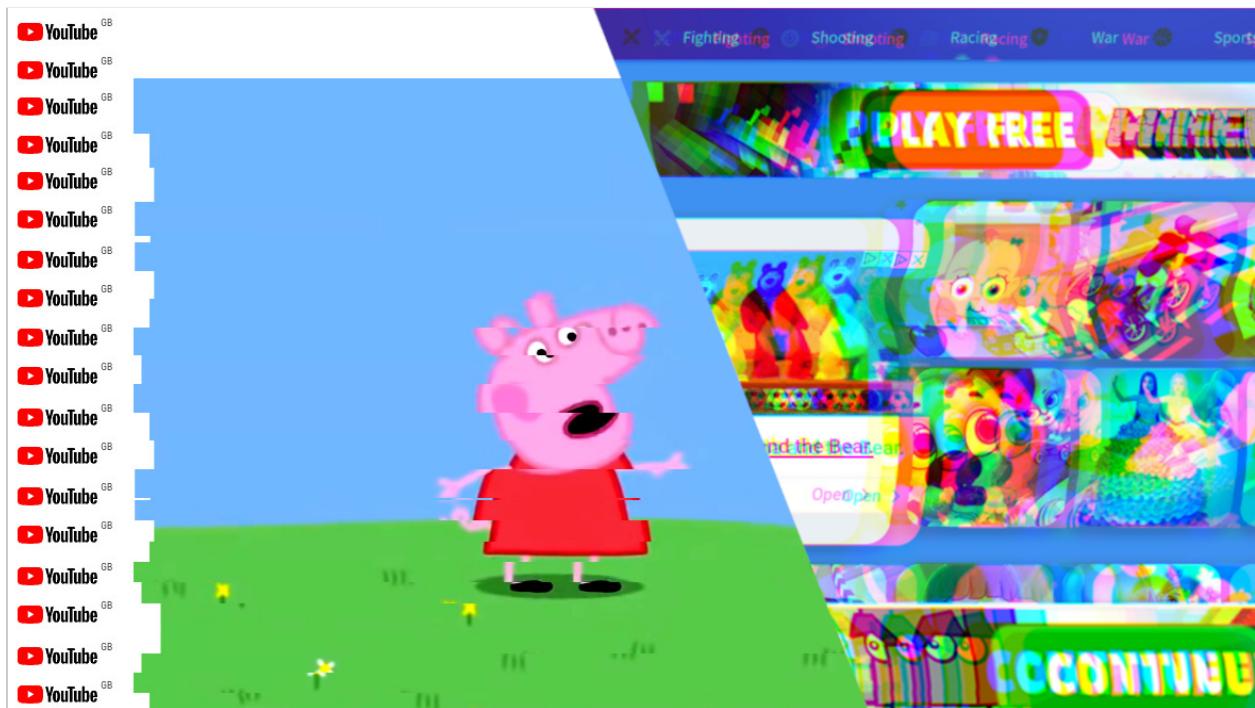


Tracking Exposed Special Report: Non-logged-in children using YouTube

How does YouTube use data about non-logged-in under 18 users?
What adverts, and potentially harmful content,
are they exposed to?

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Foreword

Tracking Exposed has been investigating social media platforms' algorithms and their impact on society since 2016. This report is an investigation into how **YouTube** treats users who are under 18 and visit its main platform while not logged in, which is one of the most common ways children access YouTube.

YouTube is extremely popular with children, including very young children. Ofcom estimates it is used by almost 90% of UK children, making it the most popular social media platform amongst under 18s. Under pressure from public opinion and from regulators to improve its protections for children, it has announced a succession of changes to its products.

YouTube emphasises the child safety features of its dedicated YouTube Kids site and apps, and the parental controls and supervision functionalities which can be introduced for logged-in users. However, there is nothing to stop under-18s using the main site, rather than YouTube Kids. There is no general age gating, just some age gating of specific videos classified as "over 18". A huge amount of content likely to appeal to very young children is present.

It is therefore not surprising that recent evidence from Ofcom suggests that in the UK most children, including most very young children, visit the main YouTube site as well as, or instead of, YouTube Kids. The same research suggests that most of these young users do not have YouTube accounts/profiles.

In other words, **it is extremely common for very young children to be viewing YouTube as non-logged-in users**—indeed Ofcom's data suggests this is probably the most common way for young children to access YouTube content.

Tracking Exposed was commissioned, by Foxglove and Global Action Plan, to investigate how YouTube's recommender systems and advertising policies are applied to these non-logged-in users. It was generously funded by Changing Ideas and Luminare. Our findings show that there are significant concerns with how YouTube treats this large cohort of under 18 users, both in terms of the extent to which they

have their behaviour tracked, and the extent to which they may be exposed to inappropriate and potentially harmful content.

This report highlights that:

There is a need for much greater transparency from platforms on the implementation of their privacy and safety measures. Investigating beyond YouTube's claims about how children use their platform was extremely challenging because claims are mainly made through media releases, and not backed up with any independently verifiable data.

There is a need for greater focus on the experiences of, and safety provisions for, non-logged-in users on platforms likely to be accessed by children. Child-specific versions of these platforms attract only a fraction of the attention of children, many of whom continue to access the main version of sites like YouTube. The child-specific versions of the platforms therefore must not attract all the attention of regulators or concerned groups either.

There remain important questions around how, and if, YouTube is fully adhering to data protection rules such as the GDPR, UK Data

Protection Act, or UK Age Appropriate Design Code. The GDPR, and the UK Age Appropriate Design Code, place very tight restrictions on the collection and processing of data from child users, for purposes such as behavioural profiling or targeted advertising. There is a lack of transparency from YouTube about how it conducts "age assurance", however, our research strongly suggests that it is using behavioural profiling. It therefore appears that YouTube may be using Age Assurance to restrict behaviourally targeted advertising of underage users, as required by the AADC, but using behavioural profiling to implement this "age assurance" which may itself not be AADC compliant. YouTube also appears to use behavioural profiling of such users for other purposes such as video recommendations.

There is a need for independent standard-setting and auditing of platforms' Age Assurance systems. Our researchers were able to identify clear signs that YouTube was seeking to estimate the age of under-18 users. However, YouTube offers no information as to how it does this, how effective it thinks such measures are, or how it considers them to comply with regulations such as the Age Appropriate Design Code. This highlights the inadequacy of leaving such important child safety features entirely to a platform's discretion. There is an urgent

need for a greater degree of independent standard-setting and oversight, to ensure children's safety and privacy, and to maintain public trust.

Both YouTube's policies and practices, and the UK's advertising regulatory regime, need to consider outbound links and landing pages as well as the content of the placed advert. We found many instances of age-appropriate adverts appearing alongside 'for kids' content that, when clicked, took the child user to age-*in*appropriate content. These 'landing pages' are central to modern digital advertising, but fall between the gaps of regulation. It may suit an out-of-its-depth regulator, or a platform, to confine its focus to the hosted adverts, but it does not protect children from unscrupulous ads or inappropriate products.

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~ Tracking Exposed

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Summary of Key Findings

1. **Non-logged-in children visiting YouTube are profiled based on their behaviour on the site - in possible breach of data protection laws.** YouTube appears to infer a users' age on the basis of the videos they watch, including estimating the ages of very young children. YouTube does not offer a public explanation of these practices. It is unclear how they are compatible with the restrictions on collecting and processing of children's data, set out in data laws such as the GDPR, the UK's Data Protection Act or the UK's Age Appropriate Design Code.
2. **YouTube appears to be restricting behaviourally targeted adverts for under-18 users.** Once YouTube has profiled a non-logged-in user as under-18, it appears to change their privacy settings to restrict behaviourally targeted advertising. In addition, the adverts served alongside "for kids" content, regardless of the user, were flagged as "not customised based on your data" (i.e. contextual advertising and not targeted advertising) and we saw no evidence to contradict this.
3. **YouTube appears to continue to collect and process data from non-logged-in users it has profiled as under-18, for behavioural profiling purposes other than the targeting of adverts -** such as to personalise their video recommendations and homepage.
4. **YouTube appears able to identify children as being much younger than 13 - and when it has done so it does not seek to redirect them to YouTube Kids.** Simulating very young users, by watching content primarily designed for preschoolers (e.g. Peppa Pig), led to other preschool content subsequently being recommended- despite its Terms of Service stating "you may use the service if you are at least 13 years old".
5. **YouTube sometimes recommends age-inappropriate content after 'For Kids' videos.** There remains potential for a user who has watched several "for kids" videos to be served age inappropriate content.
6. **One particularly concerning category of age inappropriate content was adult-themed fake/spoof versions of children's cartoons,** which frequently appeared on the homepages of child users alongside genuine children's cartoons. These depict disturbing and graphic content, within the format of a children's cartoon (e.g. "Squid Game Peppa Pig").
7. **Many of the adverts served alongside "for kids" videos, contained links to landing pages and websites with age inappropriate and potentially harmful content.** Viewers of "for kids" content were just one click away from such harmful content.
8. **Many of the websites linked to by adverts served alongside "for kids" content were incompatible with the Age Appropriate Design Code and YouTube's own policies.** They contained a range of tracking cookies and behaviourally targeted advertising in manners incompatible with current legislation. Some used the non-"Made For Kids" version of Google AdSense - i.e. were using age inappropriate services from YouTube's own parent company.

Background

YouTube's algorithm uses users' behavioural data (including what is watched, and watch time for specific videos) to recommend further videos to watch and maintain their engagement with the platform. YouTube uses similar user data to target users with advertising. Video recommendations appear on a user's personalised homepage, in search results, and when watching a video. Adverts include video adverts which can run before, during or after a video, and static banner adverts which are overlaid over the video or appear at the top of the recommended videos column to the right of the main video.

The use of behavioural data for recommender algorithms and targeting of advertising is commonplace, but also controversial. Particular concerns have been raised about the behavioural profiling of children, who are less able to give meaningful consent, less able to understand how they are being targeted, and more vulnerable to manipulation. Data Protection Laws such as the GDPR, and the UK's Age Appropriate Design Code (AADC), have in recent years introduced enhanced protections for child internet users, including in the AADC a direction that behavioural advertising should be 'off by default' on sites popular with children.

YouTube is extremely popular with children in the UK - Ofcom's 2022 report into Media Use and Attitudes found it to be the platform "most widely used by children; 89% used it". In recent years YouTube has announced a number of changes with the stated aim of offering "age appropriate experiences". These have included, for example, creating a dedicated "YouTube Kids" site and app, parental controls to manage what a children's profile can view, and switching off behaviourally targeted advertising for children's profiles, "for kids" videos, and on the YouTube Kids site/app.

YouTube's public statements about child safety place a heavy emphasis on the role of its YouTube Kids site and app, and the use of various restrictions and parental controls which are applied to logged-in children's accounts/profiles. Yet, Ofcom's 2022 report found that only "a minority of YouTube users aged 3-4 only used this dedicated app (40%), falling to 33% of YouTube users aged 5-7 and 18% of 8-11s". YouTube's own Terms Of Service don't allow for users this young to set up an account, and Ofcom's research found that the majority of children in these younger categories say they do not have an account - just 27% of children aged 8-11 stated that they had their own profile/account on YouTube.

In other words, **a significant proportion of children in the UK are consuming content on the main YouTube site (as opposed to YouTube kids), and are not logged in with a user profile.** We were therefore commissioned to investigate what might be the experience of these young, non-logged-in YouTube users, and the extent to which YouTube's much-vaunted safeguards to protect the safety and privacy of young users applied to this large proportion of children's use of YouTube. In particular, we explore:

1. To what extent does YouTube use data it gathers about the behaviour of non-logged-in users (also known as behavioural profiling) to estimate their age?

2. How does the recommendation algorithm treat non-logged-in users who have been profiled as under 18?
3. Does YouTube's policy of not using behavioural targeting for advertising to children apply to non-logged-in child users?
4. To what extent are non-logged-in child users of YouTube at risk of being exposed to harmful content?

Methodology

There were three main steps in our methodology.

- First, we created 100 research browsers to use for each non-logged-in user session on YouTube. We have done this following the “sock puppet” approach that creates a clean profile, in this case a clean browser, without any past behaviour or stored data that is set up to simulate particular user behaviour. For each research browser, we simulated different child-like behaviour matching various under-18 profiles (under 10 years/10-12 years; male/female) by directing our research browsers to watch the most viewed videos and channels classified as “for kids”. We also had them access the homepage at the beginning and end of each session, to compare the personalised suggestions received.
- In the meantime, we used our [youtube.tracking.exposed](#) browser extension (ytTrEx) to gather data as to the videos recommended by the platform, and the adverts served alongside them.
- Then, we conducted an analysis of the videos and adverts served to the research browsers, including manual examination of much of the material to assess for potential harms.

In total, our research browsers watched around 500 single YouTube videos. This generated data on 2000 videos which were recommended by YouTube’s algorithm, and around 1200 adverts which were served to these user profiles in the course of their viewing and collected by ytTrEx.

1) Simulating child non-logged-in profiles

With non-logged-in users, we know that YouTube builds a profile based on behavioural data (watched video, watched time, list of queries) combined with structural data (such as date, hour, location, type of browser). To understand how YouTube treats non-logged-in users who access content which is likely to mean they are a child, we created research browsers, which are clean sessions without any past behaviour or stored data, on a range of browsers and with a range of UK IP addresses, and started by accessing videos which are likely to appeal to different ages and genders of children.

We found that even watching a single “for kids” video, or making some search related to, for example, “barbie” or “toys”, appeared to be enough to start getting profiled and to begin to get a consequent personalised “for kids” experience of the platform. After watching 5 minutes of “for kids” videos, up to 80% of the videos suggested in the top section of the homepage changed to similar “for kids” content. We were unable to identify any explanation for this change in the nature

of the recommendations, other than that YouTube had used behavioural data (videos watched and watch time) to build a profile which included inferences about age.

In general, it appears that each "for kids" video watched is treated like all the others by the recommender system: its relevance decreased when watching other non "for kids" videos. It was sometimes possible to "reverse" the impact on a research browser profile of having watched a certain number of "for kids" videos, by watching other, non—"for kids" content.

We also found that after watching several "for kids" videos, the following pop-up can appear (although it is unclear when or how it is triggered):

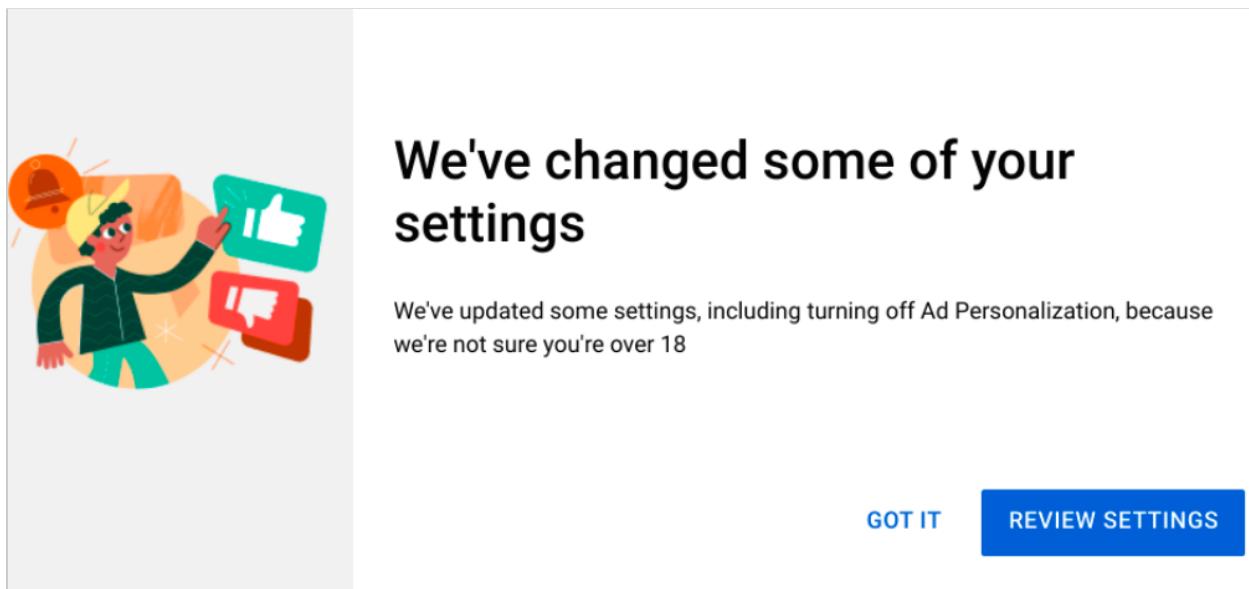


Figure 1: The Age Assurance pop-up notifies that YouTube requires an age check, and that Ad Personalization (but not content personalization) is now off for this browser.

The fact that our research browsers' simulated profiles prompted the recommender algorithm to recommend further "for kids" content, and prompted YouTube to generate a pop-up stating "we're not sure you're over 18" and that "Ad Personalisation is no longer available" gives us a high level of confidence that we had successfully simulated under-18 non-logged-in profiles, which YouTube's behavioural profiling systems had estimated as possibly having an age lower than 18.

The screenshot shows a web page titled "Settings to review". The main heading says "Here are your privacy settings. You can review them anytime." Below this, a section titled "What we've changed" is shown. Under "What we've changed", there is a heading "Google Settings" followed by a message: "Ad Personalization on YouTube is no longer available." Below this message is another message: "If you're over 18, you can manage Ad Personalization and other Google Settings, like Web & App Activity, when you sign in to your account." At the bottom of the "Google Settings" section is a blue link "Sign in to review your settings".

Figure 2: Clicking on “review settings” (Figure 1) takes a user to this page youtube.com/minor_moment

2) Gathering data from the simulated non-logged-in user profiles

We accessed YouTube using our custom open access free software (Guardoni), which automates access to YouTube's content in the UK. Another software (ytTrEx) scrapes the data from automated browsers in order to investigate the platform's algorithm and policy implementation.

The data collection pipeline emulates real users, allowing an independent and realistic monitoring of how the platform behaves when performing a determined set of actions: in this case kids-like behaviour.

To automate the research browsers, we used Guardoni, a software that relies on *puppeteer.js* to script a list of actions (open the browser, watch a given video, access the homepage). To effectively personalise a profile, we needed to watch each video to the end, as otherwise, the algorithm might think we did not like the watched video. This meant that each test needed to run up to a couple of hours to get fully personalised. Currently, this is the only way to test personalization and experimentally test the algorithm's outcomes, since the company does not provide any form of public API that allows researchers to simulate complex profiles.

Forensic evidence is collected for every experiment thanks to the ytTrEx browser extension, including the responses of our requests to YouTube's servers. This evidence consists in a machine readable file (JSON or CSV) with all the metadata of all the videos and the ads recommended to the used research browsers. The metadata relative to recommended videos (like title, author, views..)

are retrieved thanks to a parsing script that extracts this information directly from the HTML code sent to the browsers. This technology can retrieve the content suggested on YouTube's homepage, video page and search page.

The tool enables the collection of the served adverts as well, collecting the visible title and the embedded link for the various types of adverts present on the platform. It is also possible to record screenshots of the visited pages that include the preview of the served ads.

All Tracking Exposed tools are publicly available and released under an open access and free-software licence, so they can be used and reviewed by anyone.

3) Analysis of the videos and adverts shown to the non-logged-in simulated child user profiles

To answer the research questions, we compared the adverts served to profiles with different simulated interests in "for kids" videos. We also compared the set of recommendations that all the browsers received. All the collected data have been qualitatively reviewed to assess potential risks for users. Manual exploration of the platform has been driven to explore more complex usage paths and to collect a list of additional third-party sites inaccessible without manually clicking on them.

For the first part of the analysis, we created hundreds of new research browsers and we heavily personalised them, watching at least ten different "for kids" videos for their entire length. The users simulated with research browsers were experimentally manipulated with specific sets of videos belonging to the same channel (i.e. Each research browser watched one to five videos posted by the same channel). Since all the research browsers started from scratch, the manipulation done with their watching behaviour could be compared experimentally to test whether personalization was happening and if so what form it took. In particular, we tested the most popular channels viewed mainly by boys or girls, targeting specific ages like 5-8 or 8-11 or 11-13 years old (Some examples are [Peppa Pig](#) [Masha And The Bear](#), [My Little Pony](#), [Barbie](#) or [Arpo Robot](#) and [Cars](#)).

The scope was to compare the adverts served to each profile to understand if users' characteristics like age and gender were used for targeted ads. We found no evidence for this (see section (4), below).

To verify the use of users' behavioural data, we focused on the Homepage personalization. Each profile opened the homepage, and then it watched an increasing number of "for kids" videos (from 1 to 5) for their entire length and then returned to the homepage to record the recommended videos. We used the homepage as a way to compare null personalization (first access for a new browser) with the one received after providing the platform with some information on the user's interests (in this case, watching "for kids" videos).

Finally, to investigate other possible usage paths, we manually explored the platform using the previously created profiles, we opened all the appearing adverts, we manually reviewed the "Why you see this ad" information provided by Youtube for each one of them, and we explored the third party sites found.

Findings

1) Non-logged-in children visiting YouTube are profiled based on their behaviour on the site - in possible breach of UK data protection laws.

YouTube appears to infer a users' age on the basis of the videos they are watching, and to profile users it has inferred as being under 18 to personalise their experience.

It seems clear that YouTube uses the behavioural data it collects from non-logged in users to infer their age, change settings, and make content recommendations accordingly.

Over time, watching "for kids" videos leads to more content likely to appeal to children being recommended, and also triggers changes to privacy settings on the basis that YouTube is "not sure you are over 18", including the turning off of behaviourally targeted adverts (see finding 2).

YouTube does not explain, and we were unable to identify, how such profiling systems, which rely on gathering and processing behavioural data, could be compatible with the GDPR and the UK Data Protection Act, given their strict provisions regarding data collection, processing, and consent for under 13s. It was even less possible to establish how such systems were compatible with the Age-Appropriate Design Code, the provisions of which apply to all children under 18.

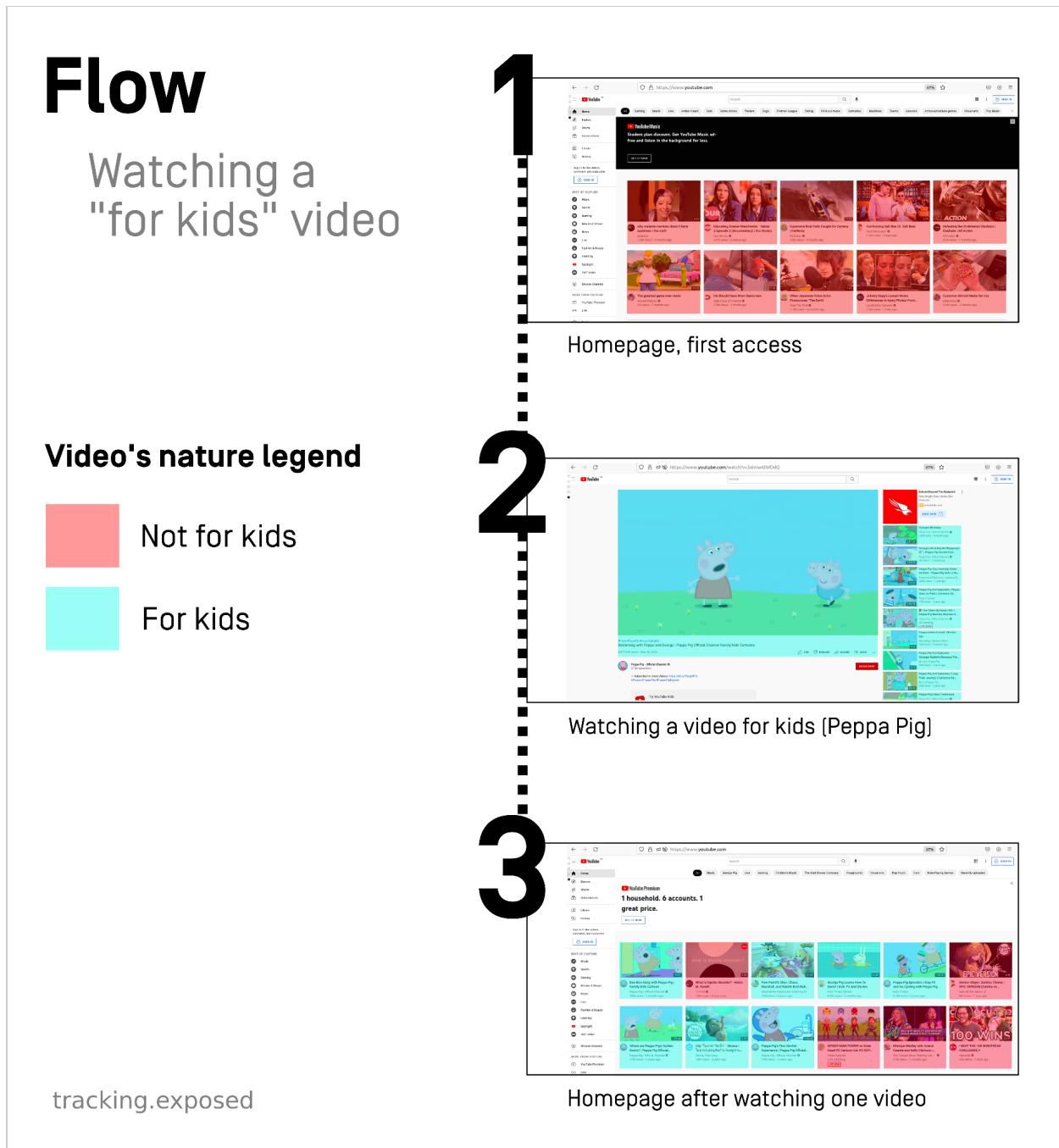


Figure 3: The behaviour of a research browser: it first accesses the homepage and records that no videos are “for kids”; secondly, it watches a “for kids” video till the end, in this case “Peppa Pig”; it finally gets back to the homepage and records seven recommended “for kids” videos out of twelve.

2) YouTube appears to be restricting behaviourally targeted adverts for under-18 users.

Once YouTube has profiled a non-logged-in as a possible under-18 user, it appears to change their privacy settings to restrict behaviourally targeted advertising (See Figures 1,2).

In addition, YouTube also appears to restrict behavioural targeting for advertising placed alongside any "For Kids" content, regardless of the age (inferred or otherwise) of the user. We examined a large volume of adverts served alongside "for kids" content. All of the adverts we inspected were labelled as "not customised based on your data".

Why this ad?

Ad personalization is turned off for this account or content, so this ad is not customized based on your data. This ad is based on other factors (for example, the time of day or your general location).

Figure 4: Pop-up with additional information explaining how an ad is served. In the case of "for kids" videos, all the ads are "not customized based on your data".

We conducted several tests to check this claim by seeking signs that the ads could also be influenced based on estimation of the user's age or gender. For example, we simulated several accounts watching exclusively and intensively Barbie (female, 10+ years) or ARPO The Robot (male, 8+ years) or MyLittlePony (female, <10 years) or PeppaPig (M and F, <5 years) videos. We didn't notice any change in the type of advertisements served alongside a specific video following these different prior viewing patterns. We expected, for example, to see more PeppaPig related advertising after watching five Peppa Pig's videos, even when watching a totally unrelated video (e.g. a music video), but this was not the case.

We could find no evidence that personal data (other than the video currently being watched) was being used for targeted campaigns alongside "for kids" videos. YouTube deserves credit for this - it appears that YouTube is adhering to its policy in this respect, and that adverts served alongside "for kids" videos were only targeted on the basis of context.

3) YouTube appears to continue to collect and process data from non-logged-in users it has profiled as under-18, for behavioural

profiling purposes other than targeting ads

Whilst YouTube may turn off the targeting of adverts on the basis of behavioural profile once it has profiled a non-logged-in user as being under 18, it appears to continue to collect and use behavioural data for other purposes. We found strong evidence that it continues to gather and use this behavioural data for its recommender algorithm.

The strongest evidence of this is that the “for kids” videos which YouTube recommends, subsequent to having profiled a user as under-18, appear strongly influenced by the user’s watching behaviour. We varied the kinds of “for kids” content our simulated profiles started off watching, to simulate different genders and childrens’ ages. The subsequent video recommendations strongly indicated that this data is used by the recommendation algorithm to suggest further videos on the homepage.

The adverts shown to the non-logged-in child user may be placed contextually – that is, relating to the content of the video rather than the user’s browsing history and other personal data – but the video placed alongside is likely to be recommended on the basis of behavioural profiling. Thus a simulated young girl user will be recommended barbie videos on the basis of behavioural profiling including her age and gender, and then shown contextual adverts alongside that video (often for barbie-related products).

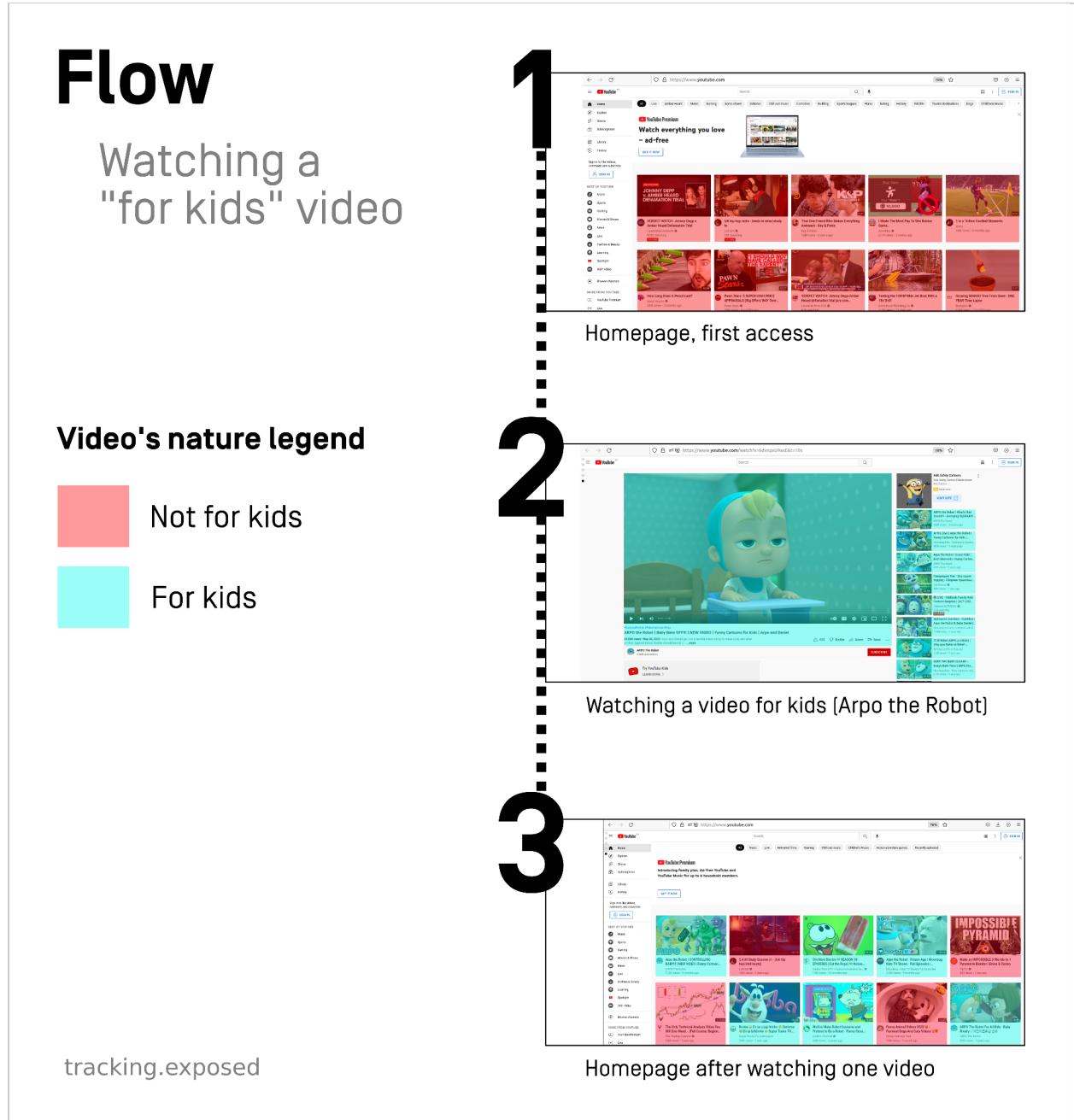


Figure 5: The behaviour of a research browser, to be compared with Figure 3. It first accesses the homepage and records that no videos are "for kids"; secondly, it watches a "for kids" video till the end, in this case "ARPO the robot"; it finally gets back to the homepage and records six recommended "for kids" videos out of twelve.

4) YouTube appears able to identify children as being much younger than 13 - and when it has done so it does not seek to redirect them to YouTube Kids

We also found strong evidence that YouTube's systems develop a more precise estimate of the age of under-18 users, including for those it profiles as under the age of 13. Research browsers which simulated very young users, by watching content primarily designed for preschoolers (e.g. Peppa Pig), led to other preschool content subsequently being recommended.

This is of particular significance given the tighter legal restrictions on the uses of data for users under the age of 13, and YouTube's own statement in its Terms of Service that "you may use the service if you are at least 13 years old". YouTube's own systems appear to profile the ages of users who are much younger than 13, and then recommend further content designed to keep them on the platform.

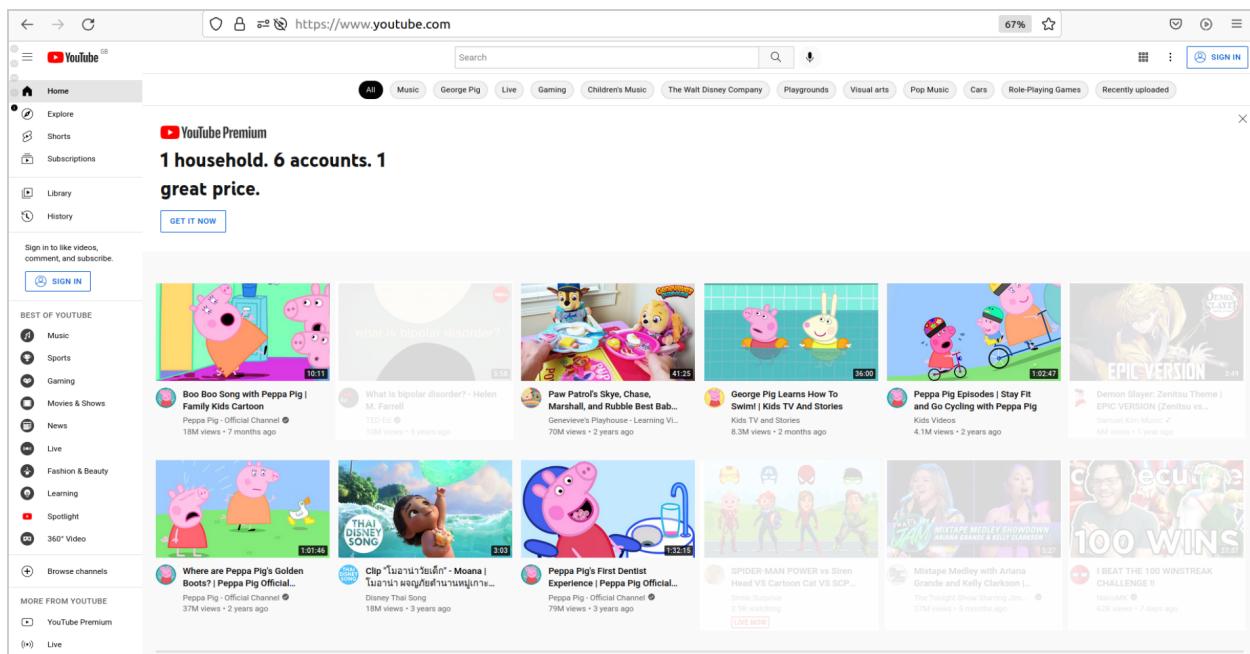


Figure 6: (Zoom of Figure 3) The recommended videos in the homepage after watching a "for kids" video. The "for-kids" videos recommended are highlighted. Not all of them are directly related to Peppa Pig channel, but the suggestions seem coherent with the average age of Peppa Pig users.

Who may use the Service?

Age Requirements

You may use the Service if you are at least 13 years old; however, children of all ages may use the Service and YouTube Kids (where available) if enabled by a parent or legal guardian.

Figure 7: YouTube's Term Of Service. In the United Kingdom the minimum age to use the service is 13.

5) YouTube sometimes recommends age-inappropriate content after 'For Kids' videos

YouTube appears to give broadly equal "weight" to each video watched by a user in its profiling. So if a child user watches a mix of "for kids" and non—"for kids" videos, they are likely to have a similar mixture recommended and offered on their homepage. **This means there is the potential for a user who has watched several "for kids" videos to still be recommended age inappropriate and/or harmful content alongside "for kids" content, and to be served behaviourally targeted adverts alongside this non "for kids" suggested content.**

However, certain policy changes do seem to have been implemented by YouTube which will serve to reduce the risks of inappropriate content being served to children. Viewing a certain number of "for kids" videos appears to trigger a change in settings to restrict behaviourally targeted advertising, which a user can only then reverse by undergoing an age verification process involving a credit card. The sensitivity of this trigger appears to have been increased in recent weeks. Videos classified "over-18" do now also require hard age verification.

In Figure 8 we can see some of the non-for-kids videos suggested to the research browsers after watching just one Peppa Pig video. We see that some of them contain content related to kids, but non classified as "for kids", which means that they could contain videos non appropriate for kids.

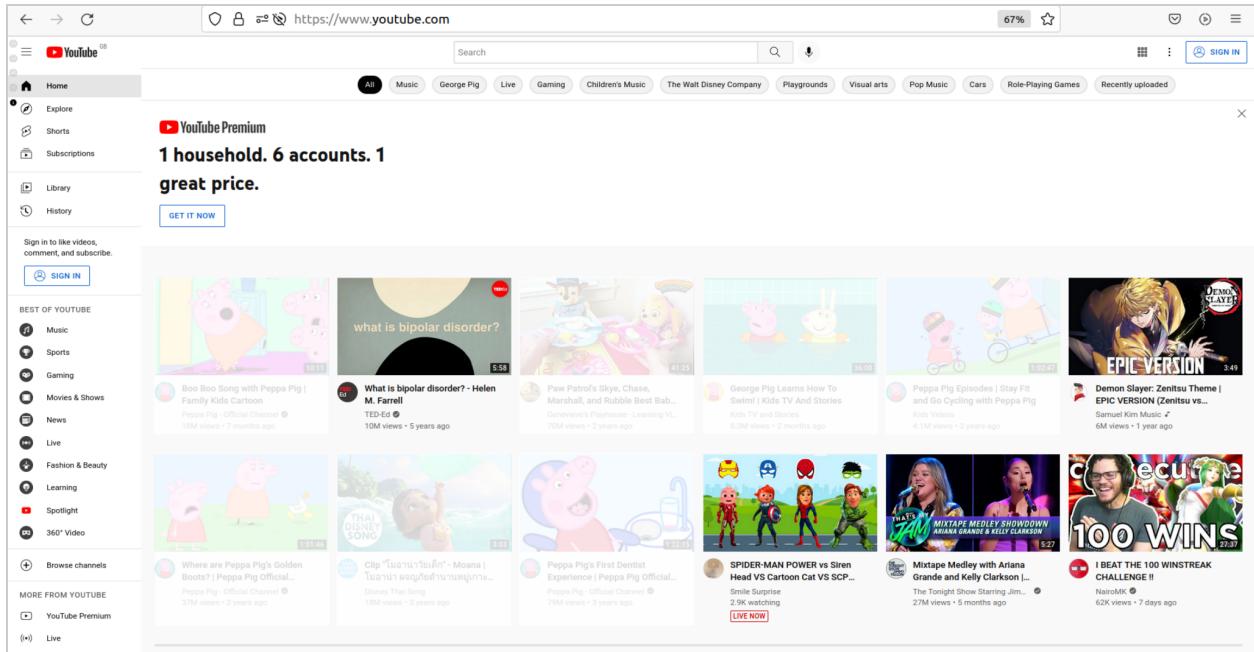


Figure 8: (Zoom of Figure 3) The recommended videos in the homepage after watching a “for kids” video. The non-for-kids videos are highlighted.

6) YouTube still has a problem with disturbing “fake” kids content, consisting of spoof, adult-themed episodes of popular children’s Shows

One particularly concerning category of age inappropriate content, which frequently appeared on the homepages of our non-logged in simulated child user, was “fake” childrens’ cartoons, which depict disturbing content within the format of a children’s cartoon (e.g. “Squid Game Peppa Pig”). The prevalence of this content is likely to be particularly concerning for parents, because its harmful nature is cloaked, and easy for even a parent who is very vigilant of what their child is watching to miss.

This is not a new phenomena – concern was being raised about such videos being recommended to young children amongst authentic childrens’ content at least five years ago. We were very surprised to see that such videos continued to feature so regularly and prominently in a simulated child-user’s recommendations since the beginning of our investigation.

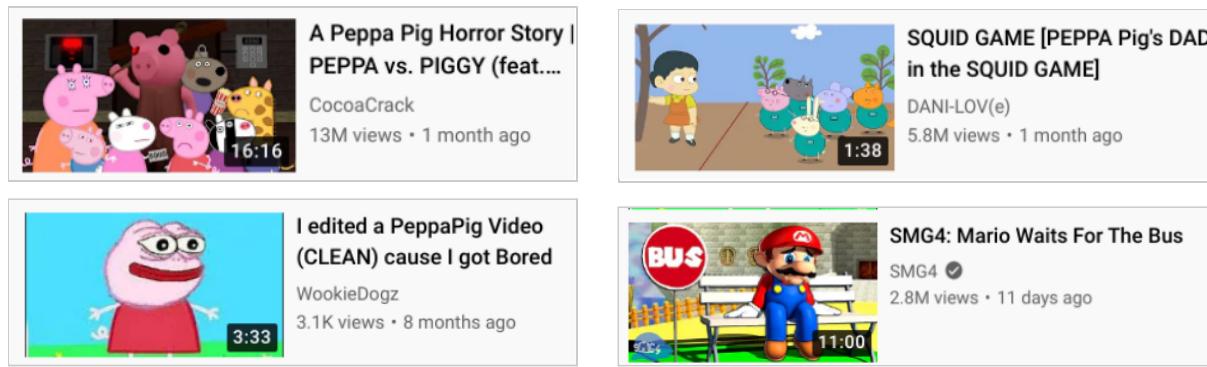


Figure 9: Examples of videos recommended on the YouTube Homepage after watching several “for kids” videos (videos’ URL: [_1,2,3,4](#)).

7) Many of the adverts served alongside “for Kids” content included links to websites which contained age inappropriate and potentially harmful content.

We found that a significant number of the adverts served alongside “for kids” videos – adverts which appeared initially to be contextual and age-appropriate – include clickable links and directed users to landing pages on third party websites, which featured a range of harmful, age-inappropriate products or services, including gambling and violent video games. This seems to us a highly cynical marketing strategy, luring children to potential harm by harnessing popular age-appropriate content.

Landing pages are extremely challenging to investigate, because it is common practice in digital marketing to conduct multi-variant tests of landing pages – meaning the same banner ad may direct to a different landing page every time you click on it. The only way to retrieve information on these ads is to click on them one by one manually.

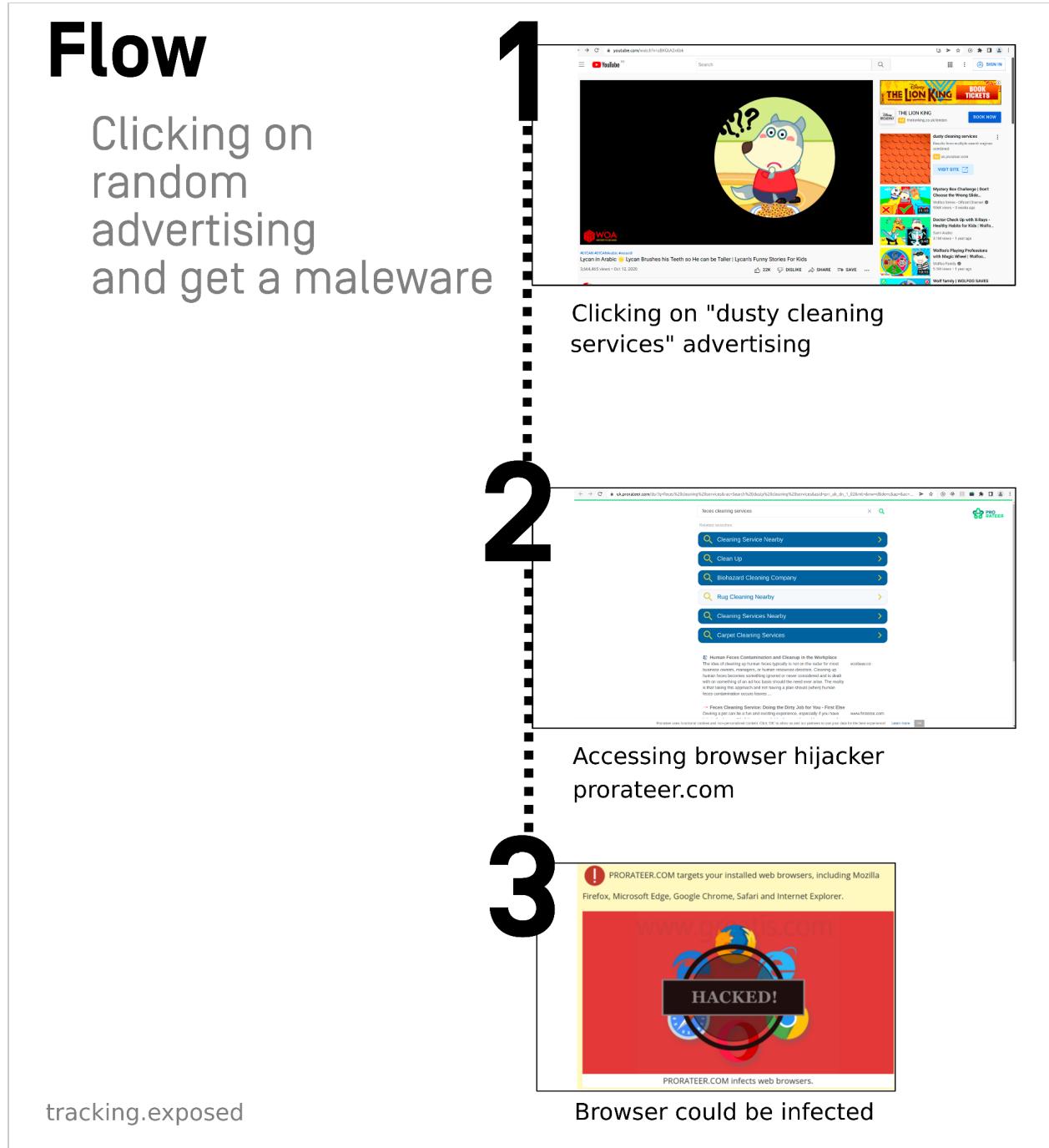


Figure 10: The research browser clicks on an ad while watching a "for kids" video (1). It gets redirected to uk.Prorateer.com in a page where a sort of search result engine is provided (2). Each of these links further redirect to other deceiving landing pages, and ultimately to advertisements, but in the meanwhile users risk to get infected by a malevolos software (3),

Manual investigation by our researchers found that whilst the adverts served directly by YouTube to the viewers of "for kids" content generally appear to be Age Appropriate, but viewers (including users which YouTube has inferred to be under-18) were just one click away from age inappropriate

and harmful content. Children being exposed to this inappropriate content is not accidental or coincidental to them having viewed an ad alongside a YouTube "For Kids" video. The purpose of the adverts, for which YouTube's customer is paying YouTube, is to actively encourage the users to make that click, and in many cases the adverts are likely to have been carefully optimised to maximise the number of users who do so (Figure 11, points 1 and 2).

Moreover, we found some contextual advertising on "for kids" videos redirecting users to sites like uk.Prorateer.com, which many authors have reported as a "browser hijacker". These sites are created to track users' browsing activity and generate revenue with pay-per-click advertising. It changes the main settings, like the homepage, new tab address, and search engine to force users to perform searches through its websites" thanks to a malicious browser extension or program installed on your computer. The advertised site uses some opaque strategies to make you install this virus-like software; for example, it hides unwanted downloads behind the button to close the window, the one to get access to a particular video, or behind fake Captcha to confirm that you are not a robot.

Because it is possible, indeed common, for advertisers to test multiple landing pages, we are unable to say how frequently the version of the page which we saw was served in conjunction with the ad which was served to our simulated profiles. However, what we can say with confidence is that we identified age inappropriate landing pages quite regularly during our tests. And we did not identify any evidence of YouTube having any proactive systems in place to prevent "for kids" adverts drawing children into user journeys on third party websites which could quickly lead them to harmful, age-inappropriate experiences.

YouTube has implicitly acknowledged that this is a problem, through the very different approach which it applies to advertising on YouTube Kids. Adverts on YouTube Kids are not clickable, and can't direct children over to third party sites. Presumably YouTube has done this because it recognises that exposing children to adverts which include clickable links to third party sites would mean risks which it does not consider acceptable for young children. **Yet it continues to expose children it has assessed as being in the same, very young, age brackets to exactly the same kind of risks on its main site.**

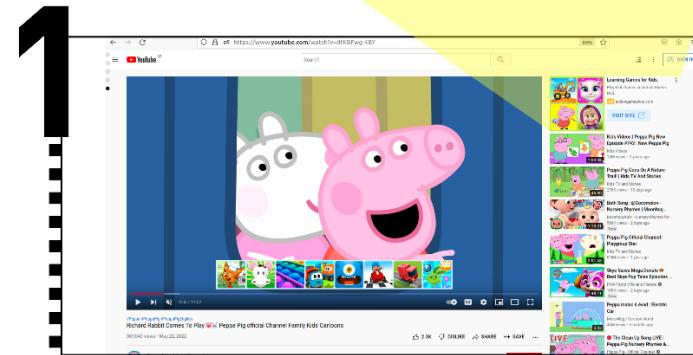
8) Many of the websites linked to by adverts served with "For Kids" videos included a range of tracking cookies and behaviourally targeted adverts.

We found that YouTube does appear to operate systems to turn off behaviourally targeted adverts for minors on its own site (albeit there are questions about whether these systems are AADC-compliant).

Flow

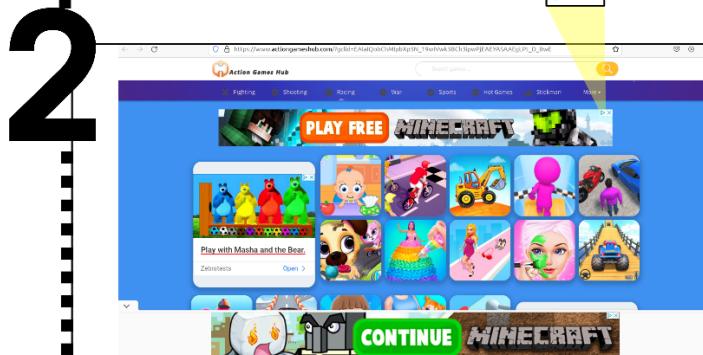
Clicking on contextual advertising

Online games advertising



Checking the advertising

Info button



Accessing the third party website

3

Google About this ad

Why this ad?

This ad is based on:

- The information on the website you were viewing
- Websites you've visited
- Google's estimation of your interests



[Report this ad](#)

Figure 11: The research browser clicks on an ad while watching a "for kids" video (1). It gets redirected to a site not labelled as "for kids", even if it contains mostly content for kids (2). The info button explaining why it got this ad tells us this is targeted advertising, and not contextual anymore.

However a non-logged-in child user of YouTube could still quickly be exposed to behavioural tracking and behaviourally targeted ads, as a result of viewing a contextually placed advert alongside a "for kids" video.

We found that many of the third party landing pages, which adverts served alongside "for kids" video are promoting, contained a range of targeted adverts and behavioural advertising which were incompatible with the Age Appropriate Design Code and with YouTube's own policies on targeting behavioural advertising at children.

Interestingly, many of these sites were using AdSense products, offered by YouTube's parent company Google, to monetise visits from users. It is possible to use AdSense in "Made for kids" mode, which turns off personalisation, but many of the sites did not do so. In other words, they were using Google "For Kids" products to lure children over to their site, but then using Google non-"For Kids" products to make money from those children's visits.

For example, we found adverts for the website actiongameshub.com offered to many of our simulated non-logged-in children's profiles, alongside "for Kids" videos.

This commercial website makes money thanks to google ads itself, is not marked as "for kids" and so includes a range of behavioural tracking practices (including targeting of adverts) which Google itself says are not appropriate for children. This includes tracking data which could potentially be used for behaviourally targeted advertising back on YouTube itself, were the child to navigate back to the YouTube site and a watch non-"For Kids" video.

As we can see in the Figure 11, the ads info button shows how the site is not considered "for kids" by ad-sense, otherwise it would have the same indication of the Figure 4 saying "*Ad personalization is turned off for this account or content, so this ad is not customised based on your data. This ad is based on other factors (for example, the time of day or your general location).*" as it used to happen to other third party sites advertising themselves on youtube "for kids" videos like kidzworld.com.

Discussion

In recent years, under pressure due to concern from parents and politicians, and in the face of increased regulatory pressure particularly from the Age Appropriate Design Code, YouTube has begun to talk up its child safety and child privacy features. However, the platform appears much less keen to talk about non-logged-in child users than it does about YouTube kids, and parent-supervised accounts/profiles. This is despite Ofcom's surveys of UK internet use suggesting that non-logged-in viewing on the main YouTube site is the main way in which children use YouTube. Our research suggests that, behind-the-scenes, YouTube must recognise this given that it is age-profiling its non-logged-in users.

It is welcome to see that, again mostly quietly and behind-the-scenes, YouTube has introduced some privacy and safety features for this category of user. However, it's notable - and concerning - that YouTube seems reluctant to highlight this use case when discussing its safety or privacy features. There has so far been insufficient transparency from YouTube about how it approaches non-logged-in child users, and insufficient scrutiny from either regulators or civil society. We hope that this report contributes to a change in this situation.

Perhaps one of the reasons that YouTube is reluctant to draw attention to its approach to non-logged-in child users of its main platform is because it raises some important questions about how "age assurance" can work without logged-in user profiles, and about the bounds of acceptability of behavioural profiling of child users for purposes other than targeted advertising.

Our research strongly suggests that YouTube uses behavioural data from individual non-logged-in users (namely, the videos watched and the watching time) to profile their age, and then implements various policies on the basis of this profiling. Essentially this appears to be a softer form of "Age Verification", sometimes referred to as "Age Assurance". However, YouTube offers no public explanation of how this Age Assurance system works, let alone information about how effective it is. The Age Assurance process for the most-popular platform among young children is surely an extremely important safety feature, of great public interest. Yet we are only able to infer its existence through quite a laborious research process, and there is a total lack of transparency or independent oversight as to how exactly it works, let alone how effective it is in protecting children from harm.

Our research also strongly suggests that YouTube continues to collect and process this data for users which it has profiled as under 18, including users it has profiled as under 13, and put it to a range of uses. No meaningful, informed consent from either the user or a parent/carer has been collected for any of this. YouTube has not made public how it approaches any of this, or how it considers it to be compliant with data protection rules such as the GDPR, UK Data Protection Act, or the Age Appropriate Design Code.

Regulation does appear to have driven some improvement in YouTube's approach to the safety and privacy of child users, including those who are non-logged-in users of the main site. Behaviourally

targeted advertising does appear to have been fairly consistently switched off for users which have been profiled as under 18. A relatively robust form of age gating (ID or credit card) has been switched on for content which has been labelled over 18. However we are not convinced that these improvements add up to either full regulatory compliance, or a safe, privacy-respecting experience for under 18s.

We identified a worrying amount of harmful content which kids can be exposed to. The problems we identified did not appear to be rare cases of content slipping through otherwise comprehensive and robust systems and processes. On the contrary, our researchers regularly identified the presence of inappropriate or harmful content across many of the different simulated non-logged-in child user accounts which we created. For the non-logged-in child user of YouTube, exposure to harmful content – in the form of both inappropriate videos and adverts which lure a child off YouTube and onto age inappropriate third party sites – is the rule not the exception.

We were genuinely surprised to discover that adult-themed spoofed versions of children's cartoons continue to appear in recommendations alongside "for kids" videos. This is a problem which has been highlighted for years now. Parents rightly expect that when they sit their children down in front of a Peppa Pig video the recommended content will be safe and age-appropriate. They are likely to find it alarming that YouTube is still not effectively protecting very young children from inadvertently watching "Squid Game Peppa Pig".

Identifying the problems with many of the adverts served to children alongside "for kids" videos required our researchers to click through on the adverts, and review the landing pages which children are encouraged to click through to when shown the ad. This may seem a reasonably obvious thing for a researcher to do – it is after all the main purpose of a lot of such adverts. "Click rate" is often one of the main metrics upon which the effectiveness of such adverts is measured. However, YouTube's own policies regarding adverts placed alongside "for kids" videos do not seem to apply the same principle. And regulatory enforcement appears to fail similarly.

Digital marketers usually create specific web pages, referred to as "landing pages" to direct the traffic from advertising campaigns. Often many different landing pages will be tested for the same campaign, with a view to identifying the optimal page content/design to maximise visitors doing whatever it is the advertiser wants them to do (watch a piece of content; view further adverts; buy a product; or share personal data). Frequently these pages are not linked through the company website and opt-out from search engine indexing. Such pages are opaque and difficult to monitor – but they are as integral to the advertising campaign as the placed advert itself.

Any effective platform policy, or regulatory regime, of advertising should surely consider the whole user journey which an advert encourages a child to take, rather than simply the first step. Yet we found a range of inappropriate content was just one or two clicks away from a "for kids video" – clicks which the adverts are *designed and optimised to encourage*.

This highlights a major challenge in the regulation of modern digital advertising, and one which current regulators have so far failed to rise to. It's easy to see why platforms would prefer to not take any responsibility for the landing pages which users are directed to by the adverts the platform

serves them. And it's hard to see how a mainly complaints-based, reactive regime can ever properly protect child users from being encouraged to click through to inappropriate content. We hope that our research contributes to an understanding that different, more proactive approaches to advertising regulation are required. Our researchers quickly found yet more evidence of problems which a regulatory regime developed in the analogue era is ill-suited to tackling.

Conclusion

It was not easy to investigate the experience of non-logged-in child users of YouTube. YouTube itself does not appear keen to acknowledge this user category, and offers little public information about how it approaches them. A general lack of platform transparency or access to platform data for independent research purposes made the process laborious. The opacity of modern digital marketing methods added further complications.

Despite these obstacles, we were able to gain some important insights into how YouTube approaches this important category of users. And whilst we were able to identify some signs that YouTube has made changes to make its main platform more age appropriate (such as turning off targeted ads for children), the overall picture remains concerning.

YouTube appears to have developed an Age Assurance system, which relies on behaviourally profiling users. It is unclear how effective this system is at protecting children, and also unclear how compliant it is with data protection law. YouTube also appears to continue to gather and process data about child users *after* it has profiled them as children - and use this to drive its content recommendation algorithm.

Whilst YouTube does appear to strictly enforce a policy against behaviourally targeting advertising to users it has profiled as under 18, such users are still served adverts which risk exposing them to a range of harms. An unscrupulous advertiser can easily pay to place adverts alongside "for kids" content which lures young viewers to click through to inappropriate sites. A young child watching a YouTube for kids video on the main site can be just a click or two away from very harmful content.

We would suggest the following policy changes should be explored further on the basis of our research:

Restricting clickable links and third party sites in adverts targeting children: YouTube already bans third party links in adverts on YouTube Kids - it would be a matter of consistency for them to apply this restriction to all adverts served to children regardless of which part of YouTube they are on, and regardless of whether or not they are for content specifically tagged "For Kids". Regulators should consider either such a ban on any advert likely to be seen by children, or ensuring that

landing pages are adequately regulated, not just the adverts themselves.

Improving transparency and setting independent standards for platforms' age assurance processes: Whilst many parents will welcome the fact that YouTube does appear to now be implementing some Age Assurance processes, there's an alarming lack of transparency or independent oversight of this critical safety process and some serious questions about its compliance with data protection laws. Parents and YouTube users have a right to know that such Age Assurance processes are effective, privacy-respecting, and fully compliant with relevant laws. Specific measures to improve safety in the platform could include setting guidance and minimum standards - covering privacy, effectiveness, and accessibility - for Age Assurance; a public API covering personalisation; and an Ad Library for all "for kids" videos.

About Tracking Exposed

[Tracking Exposed](#) is a European non-profit organisation defending digital rights through algorithmic investigations.

For more than 5-years, its team has been pioneering new methodologies to scrutinise the most influential recommender systems, such as those of YouTube, Facebook, Amazon, PornHub and TikTok. The [code](#) is released as free software, enabling anyone to use, extend or review it.

Tracking Exposed's infrastructure and methodologies have been validated in several [peer-reviewed publications](#), and the works of the team have received coverage on [major media outlets](#). Some of its reports have been cited in a [United Nations report](#), a house [testimony](#) and a [US Congress official letter](#) to YouTube's CEO.

Tracking.Exposed is also developing [YouChoose.ai](#), an alternative recommendation system for YouTube which empowers users and content creators.

Tracking Exposed was born in Italy and its legal nonprofit is registered in France. The organisation is funded through various grants and foundations, including from the NGI Ledge, the Mozilla Foundation or [Reset.tech](#).

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~ Tracking Exposed