

## **Appendix I: considering the design and impacts on competition of Apple's ATT changes**

### **Introduction**

1. This appendix provides additional background information to the section of Chapter 6 of our interim report which considers the impact of Apple's recently introduced App Tracking Transparency (ATT) privacy policy. This policy requires apps to show a specific prompt (the ATT prompt) to request users' permission for the app to 'track' them. The appendix explores the effect of the ATT policy on the targeting and measurement of personalised advertising on mobile devices, and how this has impacted the mobile advertising sector and in particular the ability of app developers to acquire new users and to monetise their apps. It also analyses the choice architecture<sup>1</sup> of the ATT prompt screen.
2. The appendix first provides an overview of how mobile advertising works, focusing on the Apple iOS ecosystem. It then explains the means Apple and third parties have to personalise ads and monitor how effective they are. Finally, it describes the changes brought about by the introduction of the ATT policy and the implications for the overall mobile advertising sector (particularly for app developers).
3. The final section of the appendix analyses the choice architecture of the prompt Apple requires third-party developers to display to users and compares it with the prompt Apple uses to request consumers' consent to be served with Apple's personalised advertising within Apple-owned apps, including the App Store and Apple News and Stocks (the Personalised Ads prompt). It describes our concerns regarding the differences between the two, which could result in contrasting implications for user data privacy decisions.
4. We do not consider in this appendix the potential impacts on consumers of the ATT framework – either positive or negative – which are discussed in Chapter 6 of our interim report. However, we note again here that Apple's stated rationale for implementing the ATT framework is consistent with the shared view of the CMA and the ICO that more competitive markets will deliver the outcomes that consumers care about most, which increasingly

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<sup>1</sup> Choice architecture describes the contexts in which users make decisions and how choices are presented to them. In online or digital settings, choice architecture refers to the environment in which users make choices, including the presentation and placement of choices, and the design of user interfaces. Examples of choice architecture are the ordering of options available to users, the user interface design for changing default settings, presentation of search results etc. See Thaler, R. H., Sunstein, C. R., & Balz, J. P. (2013). [Choice Architecture](#). In E. Shafir (Ed.), *The Behavioral Foundations of Public Policy* (pp. 428-439). Princeton University Press for details on choice architecture.

include enhanced privacy and greater control over personal data. We recognise that there are benefits to consumers as a result of ATT in relation to privacy and personal data protection, and our primary concerns relate to the specific design and implementation of the framework by Apple.

## **Mobile advertising sector and changes brought by ATT**

5. This section provides a brief overview of mobile advertising and the actors in the mobile advertising sector. It then describes how personalised mobile advertising works.

### ***Advertising on mobile devices<sup>2</sup>***

6. On mobile devices, advertisers can reach users with a variety of types of advertising through browsers, app stores and apps. In this section we describe the two key aspects of digital advertising on mobile devices, namely targeting and attribution and the different media where mobile ads can be placed (ie browsers, apps and app stores).

#### *Targeting and attribution*

7. **Targeting and attribution are two key building blocks of advertising of the mobile advertising sector.** With targeting, advertisers use information on a user's activity to target (or tailor) the ads served to them, while via attribution, advertisers measure the effectiveness of ads by linking users' actions from viewing or clicking on an ad to taking certain actions in response, eg downloading an app or making a purchase within an app.
8. There are various types of targeting, meaning that digital advertising can be targeted to mobile device users in several ways. These include:
  - **contextual:** the targeting of the advertisement is driven by the surrounding content, including the nature of the medium and the user's activity at the time of seeing the ad (for example, advertising for sports equipment served on sports-related applications);
  - **intent-driven:** the advertisement is targeted based on the user's action indicating an intent or interest (for example in response to a user's query in an app); and

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<sup>2</sup> For further detail on advertising services on mobile, see CMA (2020), Online Platform and Digital Advertising Market Study, Final Report, [Appendix G](#).

- **personalised (or behavioural)**: the advertisement is based on the information known about the user or device to which the advertisement is served, individually or as part of an aggregate group.
9. As mentioned above, attribution is the process of determining the user actions that led to the desired outcome, establishing a causal link between an ‘impression’ (ie ad view), or a click on an ad (ie ad click), and a ‘conversion’.<sup>3</sup> Examples of what may qualify as a conversion are an app install, adding an item to the shopping basket and making an in-app purchase. Attribution is needed for advertisers to measure the effectiveness of their ads, as this allows them to optimise their spending on a given ad campaign. Moreover, being able to observe the actions taken by a user as a result of seeing an ad further enriches the information which can be used for targeting, thus improving the targeting accuracy and in turn the ad’s effectiveness.
  10. Attribution is particularly important for ‘direct response advertising’, which is the type of advertising designed to get an instant response by encouraging users to take a specific action and whose payoff comes as a result of that action taken directly in response to an ad. This is different from ‘brand advertising’ which is aimed at establishing brand recognition and longer-term relationships with consumers.<sup>4</sup>

#### *Advertising via browsers, apps and app stores*

11. Ads can be served on different media on mobile devices, namely web browsers, apps and app stores.
12. In browsers, there are two main types of web advertising: search advertising and display advertising.<sup>5</sup> Search ads rely only in a limited way on personalisation,<sup>6</sup> rather they are primarily targeted to match key search terms entered on search engines (ie the ‘search query’), which typically provides most of the information needed to serve a relevant ad. Display ads are served on a publisher’s webpage, for example as a banner, and often involve personalised targeting.
13. In apps, ads can promote products and services including other apps. As discussed in Chapter 6, for app developers mobile advertising serves two broad purposes:

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<sup>3</sup> CMA (2020), Online Platform and Digital Advertising Market Study, Final Report, [Appendix O](#).

<sup>4</sup> See [What Is Brand Advertising & Why Should You Use it?](#) and [Snap Earnings, Attribution and Targeting, The Supply Chain – Stratechery by Ben Thompson](#).

<sup>5</sup> CMA (2020), Online Platform and Digital Advertising Market Study, [Final Report](#).

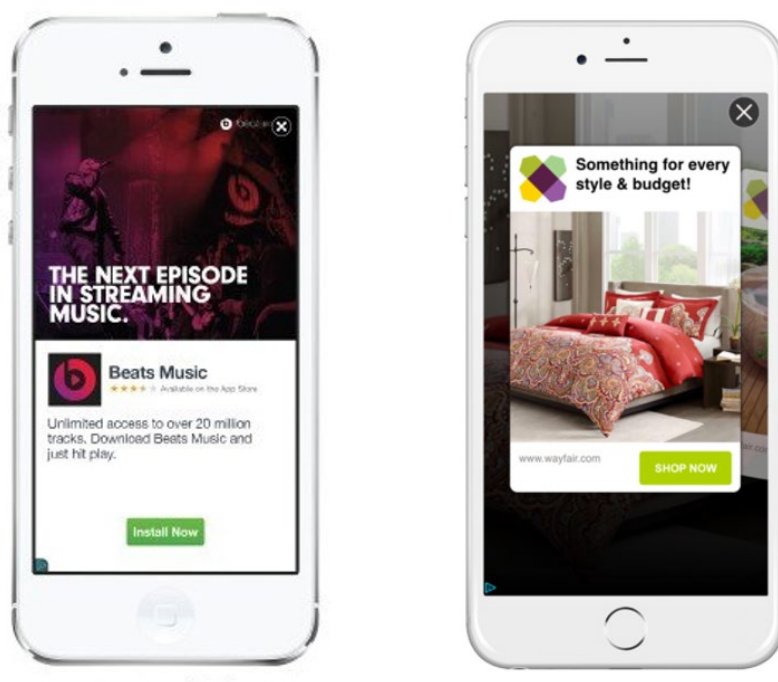
<sup>6</sup> Search ads shown to a consumer may be influenced by some limited personal data such as their location at the time of the search.

- **User acquisition**, which is the process whereby app developers reach potential users and encourage app downloads and is mostly done through developers buying ‘app install advertising’. Within mobile app install advertising, a publisher app (app P) typically publishes an ad encouraging the user to install the advertised app (app A). For example, a news app may publish an ad for a gaming app. This typically needs to rely on personalised rather than contextual advertising, as knowing a user’s behaviour and preferences is key to targeting the right app to a given user or to identifying users who will most likely exhibit ‘valuable behaviours’ (for example, those who engage in in-app purchases or frequently use the app).
  - **App monetisation**, which is how app developers fund their apps and services to users and typically involves in-app advertising, meaning ads served to users within the app. In-app advertising typically relies on a mix of contextual, intent-driven and personalised advertising. Personalisation in this case helps the advertisers to identify users who will most likely engage with the served ad.
14. App install advertising and in-app advertising are not mutually exclusive as one developer may sell in-app advertising space in the form of app install advertising for another developer. See Figure I.1 below for examples of in-app and app install advertising.

Figure I.1 – Examples of app install and in-app advertising

### APP INSTALL ADVERTISING

### IN-APP ADVERTISING



Source: [Techlomeia](#) and [SiteProNews](#).

15. On app stores, there are typically two broad types of ad placements, usually assigned to specific apps through a bid auction mechanism:
  - **Search ads**, which are ads served in response to key words entered by a user to search for apps. For instance, Apple sells search ads that are served along with organic search results when users search in the App Store, as part of its Apple Search Ads (ASA) offering.
  - **Ads for ‘suggested’ or ‘featured’ apps**, which are ads displayed on the search tab or on the app store home page before a user searches for any key words.

### ***Mobile advertising sector***

16. With the term ‘mobile advertising sector’ we refer to the collection of businesses which facilitate advertising on mobile devices. The sector is roughly divided into three sets of participants: publishers who want to sell advertising space, advertisers who want to buy that space, and a range of ad tech businesses in the middle, facilitating the process of buying and selling advertisements.
17. Advertisers often outsource the advertising process to mobile ad networks that develop and run the ad campaigns for them. They may also employ independent Mobile Measurement Partners (MMPs) to manage, analyse, and report on ad attribution data to ‘validate’ the work of the ad network (thus acting like a trusted and impartial referee).<sup>7</sup> For example, Meta points its ad network users to MMPs that can provide independent performance metrics (including attribution) and aggregate measurements across several ad networks.<sup>8</sup> In the case of app-install advertising, a third-party MMP will usually be responsible for tracking user conversions from seeing the ad to installing and using the advertised app.
18. On mobile devices this user-level tracking is largely facilitated by software development kits (SDKs). Third-party SDKs refer to third-party code that developers can choose to embed in their apps.<sup>9</sup> As such, SDKs are packages of development tools which can be added to apps to enable specific functionality. For example, apps might embed analytics SDKs (eg Google Analytics) or user authentication SDKs (eg Facebook login). The mobile advertising sector depends on advertising and analytics SDKs to run ads within apps and to measure their performance.

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<sup>7</sup> AppsFlyer, [MMP \(Mobile measurement partner\) | AppsFlyer mobile glossary](#).

<sup>8</sup> Facebook for Developers, [FAQ - Facebook App Ads](#).

<sup>9</sup> CMA (2020), Online Platform and Digital Advertising Market Study, Final Report, [Appendix G](#).

19. The CMA found in its market study into online platforms and digital advertising that 85% of the most popular apps on the Google Play Store used SDKs provided by Google and 40% had Facebook SDKs.<sup>10</sup> As Meta and Google have ad-based business models, their SDKs are largely focused on providing support to app developers for advertising and analytics.<sup>11</sup> In this context, an SDK will track a user's behaviour within the app where the SDK is installed.
20. To link user-level data between SDKs and across apps and to aggregate it as data related to the same user, mobile advertisers require some form of user-level identification.<sup>12</sup> Typically, mobile advertisers use the mobile advertising identification number (MAID) which is unique to each mobile device. This is known as the ID for Advertisers (IDFA) on iOS, and Android Advertising ID (AdID) on Android.<sup>13</sup>

### ***Personalised advertising on mobile devices***

21. This section includes a description of both: (i) how personalised advertising worked before the introduction of the ATT policy by Apple; and (ii) what the IDFA is and what its main use cases are.

### ***Ad targeting and attribution via the IDFA***

22. Before the introduction of the ATT policy by Apple, it was by default possible for mobile advertisers (including app developers) on iOS to access the unique device identifier (IDFA) for each user. The IDFA could then be shared with advertising networks and used to match the same user across multiple apps. In this way, developers could combine information collected from apps owned by different companies and use it to target ads to users, to personalise them with that information and to measure their effectiveness by tracing what users who were shown those ads did afterwards.
23. The IDFA and AdID identifiers are used by advertisers to individually identify a user, follow their behaviour on the device and match the same user across multiple apps without using personal information such as their name, email address, or phone number to do so.
24. This appendix will focus on Apple iOS and the IDFA to understand the impact of Apple's new privacy policy ATT on mobile advertising and, in particular, on app developers using mobile advertising for user acquisition and

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<sup>10</sup> CMA (2020), Online Platform and Digital Advertising Market Study, Final Report, [Appendix F](#).

<sup>11</sup> See [Facebook Developer Docs | Facebook APIs, SDKs & Guides](#) and [Android Developers](#).

<sup>12</sup> For clarity, the term advertisers here refers to those parties responsible for placing and measuring ad campaigns. This includes third-party intermediaries such as ad networks and MMPs.

<sup>13</sup> This is also known as Google Advertising ID (GAID).

monetisation. However, the overall description of the role of the IDFA will largely also apply to Android and AdID.

25. It could be argued that the IDFA has given mobile advertising an advantage over other digital advertising as it provides a more accurate identification of individual users than is technically possible on a desktop or laptop. Compared to mechanisms in use in desktop or laptop settings, the IDFA improves accuracy and efficiency for three key stages of mobile advertising: (i) user-level targeting; (ii) aggregating 'events', meaning user interactions generated by users across apps (ie 'events attribution'); and (iii) linking a specific ad campaign with a resulting app install (ie 'install attribution').<sup>14</sup>
26. First, as with the wider digital advertising sector, mobile advertising uses behavioural targeting to target individual users with ads determined to be especially relevant to them based on their previous behaviours. These previous behaviours could be purchases on other apps, clicks on ads, etc. As mobile phones are predominantly used by a single person, the IDFA allows for accurate targeting of individual users.
27. Second, the IDFA allows advertisers to build a profile of a user based on their behaviour within and across different apps. This detailed behavioural profile can be used to improve the targeting of ads and measure their effectiveness. For example, when a user is shown an ad for app A in app P, the advertiser can access data collected by SDKs in those apps, use the IDFA to check that the data is from the same user, and follow the user's journey from encountering the ad in app P, through installing and downloading app A and even observing how the user interacts with app A. The availability of the IDFA at every stage of the process allows the advertiser to accurately follow the behaviour of the user across a range of third-party apps.
28. A final key impact of the IDFA for advertisers is that it allows direct access to the data described above in real time. Within a matter of hours, the advertiser can target a user with a specific ad creative, which is the format of the ad served to users (eg images, videos, audio, etc), observe to what extent the user engages with the ad, and optimise and potentially re-deploy the ad to improve its efficacy. Such real-time optimisation of ad campaigns is only possible because advertisers, or the ad networks representing them, can combine data from a range of third-party sources with minimal time delay via the IDFA.

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<sup>14</sup> Mobile Dev Memo (2020), [IDFA deprecation: winners and losers](#) | Mobile Dev Memo by Eric Seufert.

### *User controls regarding IDFA*

29. Prior to the ATT's introduction, and since 2012, iOS users who were aware and wanted to turn off 'third-party tracking', meaning advertisers accessing their IDFA, could do so by turning on 'Limit Ad Tracking' which sets the IDFA to a string of zeros (thus rendering it non-unique). This, in practice, turned off personalised advertising across all third-party apps. Before the introduction of ATT, users were by default opted into personalised advertising across all apps and had to go to the centralised iOS settings to opt out of allowing app developers to access their IDFA by turning on the 'Limit Ad Tracking' option. It has been reported that roughly 20% of iOS users could not be tracked using the IDFA because they had enabled Limit Ad Tracking.<sup>15</sup>
30. Google has announced that as part of the Google Play services update in late 2021, users could use a central setting to instruct apps not to use the AdID to build profiles or show personalised ads to them.<sup>16</sup> In particular, in case a user opts out of interest-based advertising or ads personalisation, any attempts to access the AdID will receive a string of zeros instead of the identifier. This Google Play services phased rollout will affect apps starting in late 2021 and will expand to affect apps running on all devices that support Google Play in early 2022. Google has also said it will provide an alternative solution to support essential use cases such as analytics and fraud prevention.
31. Before this change Android users did not have an option to set the AdID to a string of zeros. Instead, Android let them reset their AdID to a new value, which remained unique.<sup>17</sup> As a result, unless a user refreshed their AdID regularly, it could still be used to target ads at them and measure ad effectiveness.

### *Ad targeting and attribution via the IDFV*

32. Apple provides each third-party company engaging in mobile advertising within iOS, namely a 'vendor', an Identifier for Vendor (IDFV). This can be used by the relevant vendor (or app developer), to monitor a user's behaviour and activity across the apps owned by that same vendor.
33. Therefore, the IDFV is to data owned by the same corporate entity (first-party data) what the IDFA is to data collected across distinct apps and services owned by different companies (third-party data). Any developer operating multiple apps can use the IDFV to monitor the actions of a user across its own apps, combine information from these different apps and use it to serve

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<sup>15</sup> Adjust, [What is an Apple IDFA? Why is the IDFA important? | Adjust](#).

<sup>16</sup> Google, [Advertising ID - Play Console Help \(google.com\)](#).

<sup>17</sup> CMA (2020), Online Platforms and Digital Advertising Market Study, Final Report, [Appendix G](#).



personalised ads to users and measure ads effectiveness. For example, Meta could do so across its family of apps, ie Facebook, Instagram, Messenger and WhatsApp.

### ***Apple's advertising***

34. This section describes Apple's advertising services, comprising of its search advertising services within the App Store, Apple Search Ads (ASA) and its display advertising services within Apple News and Stocks. It also discusses how Apple conducts its personalised advertising, including using its first-party data, and how this is served to Apple users.

### ***Apple's advertising services to third parties***

35. As covered in Chapter 6, Apple's advertising business generated 2020 revenues of approximately \$[1.5-2] billion globally and \$[150-200] million in the UK and is primarily made up of search ads that are served along with organic search results when users search in the App Store.<sup>18</sup> Apple also offers display advertising in its News and Stocks apps, which typically takes the form of ads that appear around or within news articles or other content accessed through those apps.

### ***Apple's Search Ads***

36. Apple Search Ads (ASA) allows advertisers to promote their apps directly within the App Store via placement on either the search tab or at the top of search results.<sup>19</sup> The ASA service is offered exclusively to developers of apps distributing via the App Store.
37. Apple makes use of its users' personal data for targeting its search ads. Apple told us that its ASA offering does not engage in micro-targeting of users, but instead relies on a 'privacy-by-design' solution that only uses a limited number of first-party data points to group users into segments of at least 5,000 users and display ads to them in the App Store. Advertisements may then be displayed based on these segments, to protect against an advertiser's ability to target or identify an individual user.
38. To assign users to segments, Apple said it uses random, scoped identifiers, and leverages an 'on-device protocol' that is designed to prevent any 'server-

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<sup>18</sup> [over 90%] of Apple's advertising revenue in the UK and worldwide came from search ads.

<sup>19</sup> Apple's website, [Apple Search Ads](#).

side link' between the identity of a user and the random, scoped identifiers.<sup>20</sup> Apple told us that this is done in a manner that is not visible to Apple and is protected by end-to-end encryption technology. Apple said it does not know what ads an individual consumer receives.

39. To group users into segments, Apple uses data such as account information (eg birth year, gender, location), app and content downloads and purchases (eg from Apple Music, Apple TV, Apple Books and App Store's app categories) and the types of news stories they read on Apple News. Apple told us that ads on the App Store do not access consumer data from other Apple services like Apple Pay, Maps, Siri, iMessage, and iCloud or data from devices through services and functions such as the Health app, HomeKit, email, contacts, or call history.
40. Apple also said a number of its apps implement 'differential privacy',<sup>21</sup> a technique that protects personal privacy while allowing Apple to gain insight into user behaviour at an aggregate level. Via differential privacy, Apple told us that Apple apps remove device identifiers before the data leaves the user's device encrypted. In a second step the anonymized data for different users is collected, metadata removed and characteristics permuted among the different users to make it impossible for Apple to track individuals. This anonymised data is then used to compute summary statistics, and only those statistics are shared with Apple teams to preserve user privacy.
41. For campaigns run through ASA, advertisers can use the Apple Ads Attribution API<sup>22</sup> which allows advertisers purchasing search advertising from Apple to measure the number of app installs for the App Store and attribute them to specific Search Ads campaigns.<sup>23</sup> The Apple Ads Attribution API includes granular install attribution data that is not available through attribution tools for campaigns happening outside the App Store on iOS such as SKAdNetwork API (SKAN). This is discussed in further detail below.

### *Apple's display advertising*

42. Apple also offers display advertising services on Apple News and Stock, albeit these account for a much smaller share of Apple's advertising revenue. Ads

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<sup>20</sup> We understand this to mean that the assignment of a user to a targeting segment is done on a user's device, so that more granular identifiers, that could potentially be linked to the identity of a user, are not shared with an Apple server.

<sup>21</sup> Differential privacy is a 'security definition which means that, when a statistic is released, it should not give much more information about a particular individual than if that individual had not been included in the dataset. The differential privacy definition allows one to reason about how much privacy is lost over multiple queries.' See Royal Society (2019) [Protecting privacy in practice: the current use, development and limits of Privacy Enhancing Technologies in data analysis](#).

<sup>22</sup> Apple Ads Attribution API was introduced with iOS 14.3 and supersedes Apple Search Ads Attribution API.

<sup>23</sup> Apple's website, [Attribution API - Help - Apple Search Ads](#).

on these Apple apps come in different forms including display ads or banners, video, and ‘native ads’ (namely ads that match the appearance of the media in which they are displayed, such as ads looking like news articles).

43. Apple’s advertising platform can be used to place ads on Apple’s first-party News and Stocks apps. To personalise such ads, Apple uses a range of user information such as the types of contents people consume on News and Stocks, App Store activity, Apple account information, and device location, provided the ‘Location Services’ setting is enabled and the user has granted permission to the App Store or Apple News apps to access their location.<sup>24</sup> Apple also uses the music, movies, books, TV shows and apps a user downloads, as well as any in-app purchases and subscriptions. However, Apple says it does not allow targeting based on downloads of a specific app or purchases within a specific app (including subscriptions) from the App Store, unless the targeting is done by that app’s developer.<sup>25</sup>
44. Since September 2021, Apple controls users’ opt-in to Apple’s own personalised advertising services via the Apple’s Personalised Ads prompt.<sup>26</sup> Prior to this, Apple’s ad personalisation was enabled by default and a user had to navigate the device Privacy Settings to disable it. We analyse Apple’s Personalised Ads prompt and how it compares with the ATT prompt from a choice architecture point of view in the final section of this appendix.
45. The effectiveness of app install ads running on Apple News and Stocks can be measured using Apple Ads Attribution API.<sup>27</sup>

### *Apple’s definition of tracking*

46. This section covers Apple’s definition of ‘tracking’ and its approach to personalised advertising within Apple-owned apps, including the App Store.
47. Apple defines tracking as ‘the act of linking user or device data collected from your app with user or device data collected from other companies’ apps, websites, or offline properties for targeted advertising or advertising measurement purposes. Tracking also refers to sharing user or device data with data brokers.’<sup>28</sup> As mentioned in Chapter 6, Apple’s definition distinguishes between collection of data within first-party and third-party properties, with these distinctions seemingly based on corporate ownership of the data or the property where the data comes from. A recent opinion

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<sup>24</sup> Apple’s website, [Legal - Apple Advertising & Privacy - Apple](#).

<sup>25</sup> Apple’s website, [Legal - Apple Advertising & Privacy - Apple](#).

<sup>26</sup> Benjamin Mayo, [iOS 15 now prompts users if they want to enable Apple personalized ads, after it was previously on by default - 9to5Mac](#).

<sup>27</sup> Apple’s website, [AdServices | Apple Developer Documentation](#).

<sup>28</sup> Apple’s website, [User Privacy and Data Use - App Store - Apple Developer](#).

published by the UK Information Commissioner, on the other hand, confirmed that ‘data protection law does not inherently favour the concept of a first party over that of a third party within the meanings web standards bodies or data categorisations given to those terms.’<sup>29</sup>

48. Consistent with its definition of tracking, Apple told us that it does not:
- engage in ‘tracking’ – ie it does not link user or device data collected from one developer with user or device data collected from other companies’ apps, websites, or offline properties – for targeted advertising or advertising measurement purposes;
  - use the IDFA for targeting and measurement purposes;
  - buy consumers’ personal data from, or share its consumers’ personal data with, other companies; or
  - share its user or device data with data brokers.
49. As mentioned above, Apple does, however, use its first-party data from across multiple Apple apps for advertising purposes. For instance, Apple processes a user’s App Store purchase history, together with other demographics, to personalise App Store Search Ads and advertising displayed in the News and Stocks apps.<sup>30</sup> Apple told us that, like Apple, every other developer may use first-party data across their properties to provide personalised ads through their apps and, indeed, Apple provides the IDFA to developers to facilitate this.
50. In Chapter 6 we cover Apple’s definition of ‘tracking’ and the extent to which it may favour certain providers over others.

### ***Changes introduced by ATT***

51. ATT is Apple’s new privacy policy enforced on iOS 14.5 in April 2021. The ATT framework requires apps to show a specific prompt (the ATT prompt) to request users’ permission for the app to ‘track’ them, meaning to access app-related data, including the IDFA, to follow a user’s activity across apps and websites owned by other companies.<sup>31</sup> As a result, a user on version iOS 14.5 or higher can no longer be served personalised ads in one app based on their behaviour in another unrelated app until they have explicitly opted in to ‘tracking’ for both apps.

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<sup>29</sup> ICO (2021), [Data protection and privacy expectations for online advertising proposals](#).

<sup>30</sup> Apple’s website, [Legal - Apple Advertising & Privacy - Apple](#).

<sup>31</sup> Apple’s website, [App Tracking Transparency | Apple Developer Documentation](#).

52. From a technical perspective, without consumers opting into this prompt, developers cannot access their IDFA which as noted above is typically used to monitor users' activity across apps. Apple's App Review Guidelines also state that app developers should not engage in any other form of 'tracking' if users do not opt in when shown the ATT prompt.<sup>32</sup> As further detailed below, users can also opt-out of being shown ATT prompts centrally, by disabling 'Allow Apps to Request to Track' in the device privacy settings to stop developers from surfacing the ATT prompt.
53. Apple has provided a replacement for IDFA-based attribution and measurement in the form of SKAdNetwork API, a free tool Apple makes available to developers and ad networks. We describe SKAdNetwork and how it compares to Apple Ads Attribution API in more detail below.

#### *Apple's stated rationale for ATT*

54. Apple told us that 'the goal of ATT is to empower consumers by giving them greater transparency and ability to control the sharing of their own data. When a user is tracked, her data very often ends up in the hands of other companies without the user knowing. Apple believes users should be aware of this practice and should be able to choose whether their data is used and shared in this manner.'
55. According to Apple, ATT strengthens this ability by giving users the choice, on a developer-by-developer basis, of whether to allow developers to 'track' them across other companies' apps, websites or offline properties using users' IDFA. Apple also mentioned several stakeholders, including consumer protection associations and privacy advocates, which welcomed ATT as a positive development for the industry. For instance, Apple submitted that:
  - Amnesty International, Human Rights Watch and the Electronic Frontier Foundation openly supported and advocated for the ATT changes;
  - Privacy International and The Center for Democracy and Technology respectively described the change as helping people 'assert control over the invisible leakage of their data' and 'rebalance the ecosystem'; and
  - Mozilla 'applauded' Apple's decision and publicly campaigned to discourage delay of ATT implementation.
56. We share the view of the ICO that developments that empower individuals and enable them to have meaningful control over the use of their personal

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<sup>32</sup> App Store Review Guidelines, 5.1.2 (i)-(iii).

data can bring about positive change, both for consumers and competition more broadly. **ATT has clearly introduced a greater degree of choice and control to users than they were afforded previously over whether and how their personal data is used for personalised advertising.** To this extent we consider that ATT will have some benefits to consumers with regard to their privacy.

### *Apple's enforcement of ATT*

57. Apple told us that there are two primary methods of enforcement of the ATT framework. First, if a developer has not received permission from the user through the ATT prompt to enable third-party tracking, then the developer will not receive the IDFA if they request it. Second, developers must adhere to Apple's App Store Review Guidelines, as they participate in Apple's App Review process. The app must always respect the user's response to the ATT prompt under Guideline 5.1.1(iv), which states: 'Apps must respect the user's permission settings and not attempt to manipulate, trick, or force people to consent to unnecessary data access.' In other words, developers cannot afford to attempt to go around the users' preference, as apps or app updates that do not adhere to the Guidelines can be rejected from the App Store.
58. It has been reported that it may be difficult for Apple to fully enforce this policy. In particular, we understand that there are no obvious technical means for Apple to know what data ad tech companies use (apart from the IDFA that it does not provide), whether they might be doing 'fingerprinting',<sup>33</sup> and what new technical workarounds they might find in the absence of IDFA.<sup>34</sup> Indeed, a study by privacy software developer Lockdown found evidence of a number of apps that seemed to continue to engage in third-party tracking when users opted out from the ATT prompt.<sup>35</sup>
59. Apple told us that developers must embed their custom messaging on ATT, as well as the purpose string in the ATT prompt, in the binary that they submit to App Review (typically during initial app submission and subsequent app updates). With respect to whether a developer could be tracking a user even though the user has asked the developer not to track them, Apple said that developers are responsible for ensuring they comply with the user's choices.

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<sup>33</sup> Fingerprinting refers to a process that advertisers may use to gather information about users who have interacted with their ads to identify their unique device. It works by combining certain publicly available attributes of a user's device, location, and more to create a unique identifier or 'fingerprint' of their device. The attributes that are collected to identify a user's device may include their computer or mobile hardware, operating system, IP address, web browser, and more. See [What is fingerprinting?](#)

<sup>34</sup> The New York Times (2021), [To Be Tracked or Not? Apple Is Now Giving Us the Choice.](#) - The New York Times ([nytimes.com](https://www.nytimes.com)).

<sup>35</sup> The Washington Post (2021), [iPhone apps can track you even after you tell them not to](#) - The Washington Post.

Apple said that it is also possible that violations may come to App Review's attention, such as complaints by other developers, by users, by privacy advocates, etc.

60. We note that, as mentioned above, under ATT, developers will be able to continue following users across their own first-party apps, as apps from the same company can still share information about the user via Apple's Identifier for Vendors (IDFV).

### *Actual opt-in rates*

61. Given the recent introduction of the ATT prompt and the potentially different methodologies to calculate opt-in rates, we have received a relatively wide range of estimates for opt-in rates from Apple, ad networks and app developers. Most of the estimates we received were based on an only partial adoption of iOS 14.5 where ATT prompt was rolled out and therefore might not be representative of longer-term rates.
62. Apple told us that it does not have user level opt-in data due to privacy protections. Based on Apple's internal assessment conducted at the prompt-level [X] [a significant number] of the ATT prompts displayed were accepted by users to allow third-party tracking, based on data from users who opt in to share analytics data with Apple. Given this estimate is based on users who have already opted into sharing analytics data with Apple, meaning users who have shown they are willing to share data with Apple, we consider that the estimate may overestimate the actual opt-in rate across all users.<sup>36</sup>
63. Early estimates of opt-in rates we received from app developers are fairly varied, with several ranging around 20-30%. For instance:
  - [It has been estimated in response to CMA questions] that approximately 20% of iOS users in the UK that have updated their devices to iOS 14.5 have chosen to allow third-party tracking under the ATT framework. Based on an internal assessment submitted in response to CMA questions, opt in rates vary by region and app publisher's app category (eg with disallowed being higher for Fitness than for Shopping apps).

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<sup>36</sup> Consistent with this, Apple told us that data from an opt-in population may be 'subject to substantial selection effects' (with those most likely to be comfortable and frequent users of Apple's products and services being the most likely to opt-in to the data collection) which 'render it unsuitable as a dataset from which to draw any conclusions regarding aggregate population usage', and when asked Apple agreed that its ATT opt-in estimates may also be subject to similar biases.

- Meta told us that the opt-in rate of users of iOS 14.5 or above versions on the apps of the Meta family that showed the ATT prompt was [X],<sup>37</sup> a [X] decline from opt-out figures pre-ATT (ie using Apple's 'Limit Ad Tracking' feature). Meta told us that for it to be able to share data to enable ads personalisation and measurement, users need to opt in on eg both the Facebook app and any third-party app which advertises on the Facebook app. As a result, the actual percentage of consumers who have opted-in twice could be even lower.
- [An app developer] told us that the opt-in rate for ATT on its app is 27%.
- [Another app developer] told us it assumed opt-in between 10% and 30%.
- McDonald's told us it has seen opt-in rates between 20–30% globally.
- Duolingo told us that as of the date they submitted information to us (September 6, 2021) approximately 34% of users who are shown the ATT permission prompt choose to 'Allow Tracking' and that approximately 30% of users are not eligible to be prompted by the ATT framework, as they have already disabled third-party tracking in their system settings.
- [One developer] provided a third-party assessment of the ATT implementation which assumed an opt-in rate of approximately 14% coming from multiplying the opt-in rate in benchmark apps (around 33%) and opt-in rate in ad platforms (around 42%) given that attribution requires the user to opt in on both the publisher and the advertiser side.
- A preliminary analysis of [one app developer]'s brands currently suggests that the consent/opt-in rates for ATT are between 25-30%.

64. Others provided very low early figures. For instance:

- [One developer] told us that early testing indicated an opt-in range under 5%; and
- Microsoft told us that it is not yet certain of the impact of ATT changes but that data it has reviewed so far indicates that 'the vast majority of users' of its apps have denied permission.

65. We note that public estimates of opt-in rates are also varied. For instance, estimates from AppsFlyer suggest that, as of 23rd November 2021, 46% of users globally who have seen the ATT prompt opted in.<sup>38</sup> Differently,

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<sup>37</sup> According to Meta, this figure is lower compared to the actual number of users of iOS 14.5 or above versions who were shown the prompt on Meta apps and opted in [X] due to a [X].

<sup>38</sup> See [iOS 14 & ATT benchmarks \[Report\] | AppsFlyer](#). Based on 80% iOS 14.5 user adoption rate.



estimates from Flurry suggest a worldwide weekly opt-in rate of 23% across apps that have displayed the prompt in September 2021 with the figure being stable and ranging between 31% and 22% since the release of the ATT prompt.<sup>39</sup>

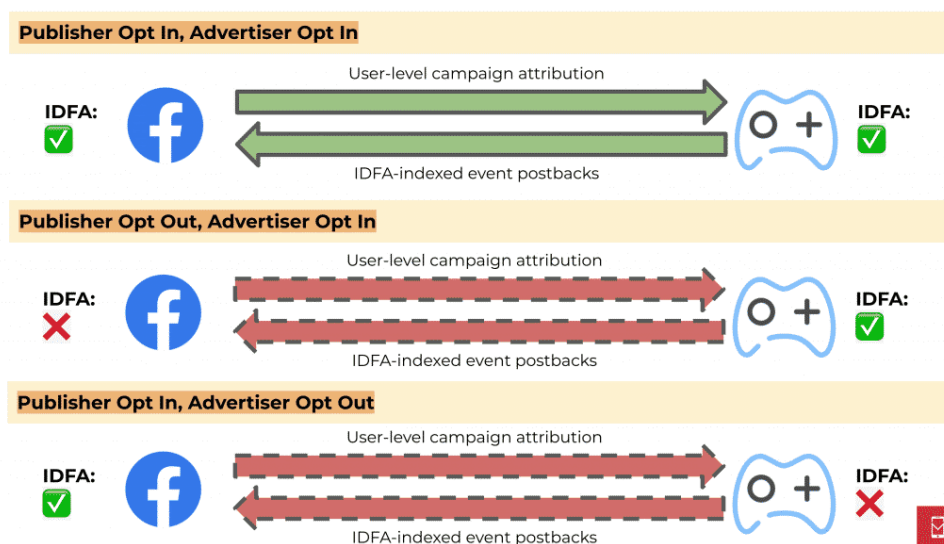
66. As detailed in Chapter 6, we note that most of the estimates we have seen so far are significantly lower than the opt-in rate suggested by Apple. However, the recent introduction of the ATT framework and the partial adoption of iOS 14.5 might mean that it is still early to calculate robust opt-in figures or that current estimates are not necessarily informative of the longer-term trend. This is confirmed by the material differences in the figures we have received from various developers and seen in media reports.
67. Furthermore, we note that opt-in rates are likely to be significantly influenced by the design and layout of the ATT prompt, including when and how the choice is presented to users as well as the language used. We analyse in detail the choice architecture of the ATT prompt and how this could be influencing opt in rates in the section below. In the same section, we also compare the choice architecture of the ATT prompt with the choice architecture of the Personalised Ads prompt and considered how any differences between the two may influence different user choices.
68. Finally, as mentioned at the start of this section and elsewhere,<sup>40</sup> IDFA-based advertising relies on users opting in for ATT across multiple apps (see Figure I.2 below). Hence, each developer's estimate of their users' ATT opt-in rate is likely higher than the actual proportion of their users for which they can use IDFA for advertising.
69. Regardless of the precise estimate, as we noted in Chapter 6 of our interim report, we recognise that low opt-in rates will to some extent reflect the feeling among many consumers regarding the collection and use of their personal data.

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<sup>39</sup> Flurry, [iOS 14 Opt-in Rate - Weekly Updates Since Launch | Flurry](#).

<sup>40</sup> Mobile Dev Memo, [ATT opt-in rates are irrelevant | Mobile Dev Memo by Eric Seufert](#).

Figure I.2: IDFA-based advertising relies on users opting in for ATT across apps



Source: [ATT opt-in rates are irrelevant.](#)

### Impact of ATT mobile advertising and app developers

70. The ATT framework is likely to impact app developers engaging in mobile advertising in two main ways:
- by undermining developers' ability to acquire users through buying app install advertising; and
  - by undermining developers' ability to monetise their app through selling in-app advertising.
71. In particular, by restricting developers' ability to personalise ads for both app install advertising and in-app advertising, ATT makes both user acquisition and monetisation less effective.
72. Moreover, ATT also disrupts attribution, which further reinforces the two impacts above.

#### Impact on app install advertising

73. As explained above, app install advertising is used by app developers as a way to acquire users for their apps.
74. No access to the IDFA means companies cannot rely on IDFA-based industry standards for mobile advertising, both in terms of personalising advertising and measuring its effectiveness via attribution.
75. Without the IDFA, app install advertising has less information on the user to perform ad targeting as it cannot follow users and their activity across apps,

websites and offline properties. This means that app install advertising cannot, beyond a developer's first-party apps and properties, identify users who are likely to show 'valuable behaviours' such as engaging in in-app purchases, using the app a lot, etc. This limitation on ad targeting of 'valuable users' thus translates into less effective and remunerative user acquisition.

76. Meta told us that for advertisers the costs per impression (CPMs)<sup>41</sup> for users on iOS 14.5+ were on average [X%] higher than CPMs for users on iOS 14.4 or below (pre-ATT). When considering CPMs for app install campaigns alone, the increase reaches [X%]. This illustrates that ATT particularly impacted app install advertising, and that developers have had to pay higher costs to advertise their apps.

### *Impact on in-app advertising*

77. In-app advertising is similarly impacted if the IDFA cannot be used.
78. As with app install advertising, the impact concerns both targeting and attribution. Similar to the mechanism outlined above, no access to the IDFA means that ad network operators cannot follow users and their activity across apps, websites and offline properties and therefore have less information on the user that they can use to personalise advertising.
79. This means that app developers monetising via in-app advertising cannot use information gathered across third parties' properties to refine the ad personalisation and can only rely on consumers' activity in their own properties for this. This is particularly problematic for small developers with a limited or niche audience. As a result, developers monetising via in-app advertising generate lower revenue from advertising, which might push them to consider alternative monetisation models.

### *Impact on attribution*

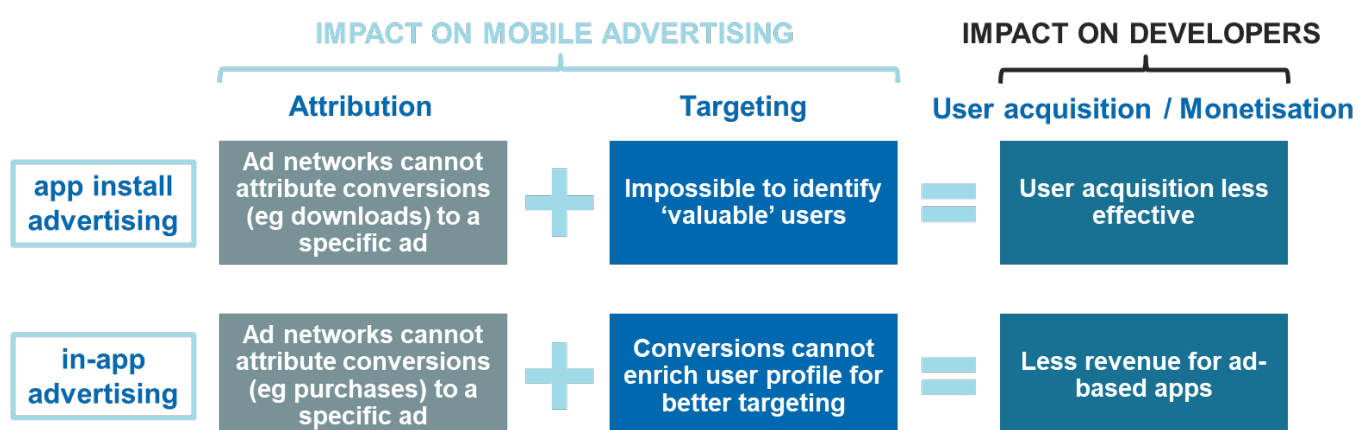
80. As mentioned above, attribution is needed for measuring the effectiveness of an ad and thus for developers to efficiently allocate budget to both app install advertising and in-app advertising. In particular, without the IDFA, ad network operators can no longer attribute conversion events to a specific ad. This in turn means that advertisers cannot accurately measure the performance of their ad campaigns and ad formats, nor optimise their budgets against their expected returns.

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<sup>41</sup> Cost per impression, often abbreviated as CPMs standing for cost per mille, corresponds to the cost incurred by an advertiser for a thousand ad views.

81. Furthermore, attribution is also needed to enrich the user's profile on the basis of the observed conversions, such that ads can be better targeted to that user in the future. For instance, if a user enables access to the IDFA:
- when the user clicks on an ad on Facebook they are redirected to either a website or an app and Facebook may observe how they interact with these properties, either through a pixel present on the website or through a Facebook SDK integrated into the app;
  - Facebook may then record this information using the IDFA linked to the Facebook ID to match what it gets from the destination property with a specific user (ie the pixel sending data linked to the Facebook ID, or the app sending the IDFA attached to the conversion events) and then use this to enrich the user's profile;
  - this means Facebook knows more about what the user likes and can use this to serve better ads to them based on what they are most likely to click on and interact with, including making purchases.
82. Therefore, ATT's impact on attribution further affects app install and in-app advertising, as it not only makes it more difficult for developers to allocate budget to advertising effectively, but also makes targeting less efficient.
83. Figure I.3 presents a summary of the ATT impact on app install advertising and in-app advertising and in particular what worse attribution and worse targeting for each means in terms of impact on developers' monetisation and user acquisition.

Figure I.3: Impact of ATT on mobile advertising



Source: CMA analysis

### *Impact on ad networks (Facebook's example)*

84. The major ad platforms are 'self-attributing networks' (SANs), meaning networks that own the inventory they sell so can attribute their traffic themselves without third-party mobile measurement partner. Meta, Twitter, Snapchat, and YouTube are examples of SANs.
85. After the introduction of ATT, ad networks are restrained in their ability to offer effective personalised ad serving or meaningful campaign analytics to developers and advertisers on iOS devices (see Box I.1: Example of Meta Audience Network below).<sup>42</sup> For instance, Meta submitted that ad tech service providers will no longer be able to:
- rely on activity data to build consumer profiles to improve ad personalisation;
  - produce analytics and machine learning models to help advertisers improve their ad campaigns; and
  - provide effective ad attribution and report to advertisers on conversion rates.
86. Meta also told us that, while advertisers used to pass conversion events to their technological partners through the partner's SDK for all users, it is now possible only for users that have been shown the ATT prompt and have opted in.
87. The impact of ATT on Meta Audience Network is described in Box I.1 below. Meta has been serving the ATT prompt to its users on its family of apps.

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<sup>42</sup> Stratechery,

### Box I.1 – Impact of ATT on Meta Audience Network (MAN)

When Facebook (now Meta) initially entered the mobile advertising sector it was a leading publisher app. Because of its user reach it was an ideal place for advertisers to place their ads and Meta leveraged the large amount of behavioural data it held on users to provide cutting edge user-level targeting. To grow the amount of ad inventory it could publish ads on, Meta developed into a quasi-ad network by introducing Facebook Audience Network (now Meta Audience Network, MAN), which enables advertisers to extend their Facebook ad campaigns to third-party apps and websites.[1] MAN is a specific type of ad network called a Demand Side Platform (DSP) as it allows advertisers to buy ad inventory from a range of publishers.

MAN is supported by Facebook's SDKs, which we have seen are found in around 40% of Android apps. [2] These in-app SDKs allow Meta to place ads on third-party apps which it does not own as well as to track user behaviour on those apps more generally. Using the IDFA to identify a unique user, Meta could build a profile of the user across all apps containing a Facebook SDK. This meant that, pre-ATT, Meta could follow a user who clicked on an ad on Facebook, Instagram, or any third-party MAN participating app, then directly see how they behaved on the advertised app or website.

ATT breaks that event stream data by preventing Meta from tracking third-party events unless the user has opted in to tracking for both Facebook and the third-party app.

Meta can still track opted-out users across its own first-party apps (including the main Facebook app, Instagram, WhatsApp, and Facebook Messenger) however it will not have access to the IDFA to facilitate such tracking, but only to the IDFV. Commentators have pointed out that if ad-driven platforms like Facebook cannot track how people interact with other apps, they would work to keep people on their apps as much as possible, especially for activities like shopping, and ensure remunerative interactions happen on their platform.[3] [4]

[1] Business Insider, [What Is Facebook Audience Network and Why Does It Matter](https://www.businessinsider.com/what-is-facebook-audience-network) ([businessinsider.com](https://www.businessinsider.com))

[2] CMA (2020), [Appendix F](#), Online Platforms and Digital Advertising Market Study.

[3] [PayPal + Pinterest would create a formidable Content Fortress](#) | [Mobile Dev Memo by Eric Seufert](#).

[4] The Verge, [Super apps are coming, and they'll never let you go](#) - [The Verge](#).

### ***Alternatives to IDFA for attribution and measurement on iOS: SKAdNetwork***

88. Without users opting into allowing developers to use their IDFA to link information on their activity across apps and websites, developers can only use their own first-party data and contextual information to perform ad targeting and personalisation. Apple does not provide them with alternative ways of doing so. However, as mentioned above, Apple has provided a replacement for IDFA-based attribution and measurement in the form of

SKAdNetwork (SKAN),<sup>43</sup> a free tool Apple makes available to developers and ad networks.

89. A very first version of SKAN (1.0) with limited functionality was introduced in March 2018 as a privacy-enhancing API for the measurement of mobile ad campaigns for iOS apps.<sup>44</sup> Apple told us that SKAN APIs hold advertising data on-device separate from apps, allowing advertising conversion measurement to be reported without users being tracked. Indeed, SKAN API only sends limited data on app installations and ad conversions to the ad network attributed to an ad campaign.
90. At the time SKAN was first introduced, and even when SKAN 2.0 was released in September 2020, there was limited incentive for its use over other third-party attribution systems, such as those using Google or Meta SDKs. However, given the limitation introduced by the ATT rollout to third-party attribution systems, more market participants are now using SKAN.
91. Adoption of new SKAN versions is becoming an increasingly important factor as Apple has been adding more and more features in each new release.<sup>45,46</sup> Indeed, Apple told us that it has heard various external feedback from developers and ad players on SKAN APIs and has responded to such feedback introducing major advancements for SKAN. These include:
  - View-through attribution, which allows the distinction between view-through impressions and click-through impressions, meaning respectively impressions which are only viewed by a user and impressions on which the user actually clicks; This is only supported starting from version 2.2, while version 3.0 also supports multi-touch attribution<sup>47</sup> (versions respectively used by 27% and 14% of networks and publishers implementing SKAN as of September 2021).<sup>48</sup>
  - Private Click Measurement, an iOS feature separate from SKAN which allows ad networks to measure the effectiveness of advertisement clicks within iOS or iPadOS apps that navigate to a website.<sup>49</sup>
  - Multiple postbacks, which are the signals coming from an advertiser telling an ad network and developer whether a conversion was

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<sup>43</sup> The 'SK' refers to StoreKit, a set of developer tools to support in-app purchases and interactions with Apple's App Store.

<sup>44</sup> Dataseat, [The Evolution of SKAdNetwork – Dataseat Ltd.](#)

<sup>45</sup> AppsFlyer, [iOS 14 & ATT benchmarks \[Report\] | AppsFlyer.](#)

<sup>46</sup> Dataseat, [The Evolution of SKAdNetwork – Dataseat Ltd.](#)

<sup>47</sup> Multi-touch attribution involves monitoring multiple touchpoints (as opposed to eg the last click) in a user's journey to a conversion, with a view to characterising which touchpoint was determinant in leading to the conversion.

<sup>48</sup> AppsFlyer, [iOS 14 & ATT benchmarks \[Report\] | AppsFlyer.](#)

<sup>49</sup> GitHub, [privacycg/private-click-measurement: Private Click Measurement \(github.com\).](#)

successful. Postbacks can now be sent to up to six ad networks (a ‘winning’ network and five unsuccessful ones).

- Starting from iOS 15, developers of advertised apps can opt-in to get copies of the winning postbacks that represent successful ad conversions for their app.<sup>50</sup>
92. To use SKAN, the advertised app, ad network, and publisher app must all be registered with Apple.<sup>51</sup> SKAN provides campaign-level data. When an app is installed and opened for the first time (if this happens within 60 days of installation) SKAN sends the ad network information in the form of an ‘install postback’:
- This includes data on the source of the app install (eg the ID of the publisher app),<sup>52</sup> the associated ad campaign, the IDFA on opted-in users, and some limited information about how the user interacted with the app the first time they opened it (ie one specific action captured as a single ‘conversion value’).<sup>53</sup>
  - The postback does not include any personal data, user-level attribution data, or any post-install metrics on how a user engages with the app after the first time they opened it. It also does not contain ad creative<sup>54</sup> IDs, which forces ad networks to use different campaign IDs instead, if they want to measure the impact of ad format (within a limit of 100 campaigns per app per ad network).<sup>55</sup>
93. SKAN does not support web attribution (ie attribution to an ad displayed on the web), although it was reported nearly 10% of app installs are preceded by a visit to a brand’s website.<sup>56</sup> However, as mentioned above, Apple introduced Private Click Measurement as a means to address app-to-web and web-to-web traffic.<sup>57</sup>
94. SKAN has different timeframe settings compared to pre-ATT measurement tools. In particular, with third-party attribution systems using IDFAs and SDKs,

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<sup>50</sup> Apple referred to some stakeholders praising particularly this last advancement.

<sup>51</sup> Apple, [Registering an Ad Network | Apple Developer Documentation](#).

<sup>52</sup> It has been reported that this App ID makes it possible to determine which app categories (eg gaming) advertises most and with what kind of publishers. See [Inside SKAN: SKAdNetwork insights \[Guide\] | AppsFlyer](#).

<sup>53</sup> AppsFlyer, [What is SKAdNetwork? | AppsFlyer mobile glossary](#).

<sup>54</sup> The creative is the format of the ad served to users on a webpage, app, or other digital environment. It can be images, videos, audio, etc.

<sup>55</sup> Stratechery, [An Interview with Eric Seufert about the Impact of ATT – Stratechery by Ben Thompson](#).

<sup>56</sup> AppsFlyer, [iOS 14, winds of 2020 and the web comeback | AppsFlyer](#).

<sup>57</sup> For app-to-web and web-to-web campaigns Apple has introduced Private Click Measurement (PCM) for attribution and tracking. PCM mirrors SKAN in that it aims to replace pre-ATT real-time user-level tracking with more limited and time-delayed attribution data. PCM does not just apply to advertising but also covers any form of tracking and click attribution between websites. (for more detail, see [Introducing Private Click Measurement, PCM | WebKit](#)).



an ad network could determine what maximum period of time between an ad view and app install counted as a conversion. By contrast, SKAN sets fixed time limits on what is considered a conversion based on the time between the user interacting with an ad, installing the app, and opening the app for the first time. The time limits depend on the level of interaction with the ad:<sup>58</sup>

- If a user views the ad for a minimum of 3 seconds it is considered a ‘view through ad’. If the user then installs the app within 24 hours of seeing the view through ad, and also opens the app within 60 days, an install validation postback is sent to the ad network.
- Alternatively, if the user clicks on the ad through to the App Store it is considered a ‘StoreKit rendered ad’. If the user then installs the app within 30 days and also opens it within 60 days, a postback is sent to the ad network.
- In all other scenarios, such as if a user downloads an app 25 hours after viewing an ad displayed in another app, and then opens the advertised app, no install validation data is ever sent to the ad network.

95. In addition, with SKAN, the install validation postback is not sent in real-time, as it was possible pre-ATT, but between 24 to 48 hours after the app is opened.<sup>59</sup> It has been reported that this delay makes it difficult to understand if an ad is performing well or not.<sup>60</sup>

#### *Evidence from market participants on SKAdNetwork*

96. As mentioned in Chapter 6, we have heard concerns from app developers, ad networks and industry commentators that SKAdNetwork is an inferior alternative – with regards to attribution effectiveness – not only to IDFA-based attribution and measurement but also to the Apple Search Ads Attribution API Apple makes available to users of its own advertising services. This is because it gives developers less granular data and sends them information on conversions with a delay. These concerns are summarised below, and key differences in output from the two APIs are summarised in Table I.1.

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<sup>58</sup> Apple, [Receiving Ad Attributions and Postbacks | Apple Developer Documentation](#).

<sup>59</sup> Apple, [Receiving Ad Attributions and Postbacks | Apple Developer Documentation](#).

<sup>60</sup> Stratechery,

**Table I.1: key differences in output from SKAdNetwork and Apple Ads Attribution API**

	<b>SKAdNetwork</b>	<b>Apple Ads Attribution API</b>
Time delay	24-48h	n/a
Ad click date and time	Not included	Included
Ad creative ID	Not included	Included
Country or region	Not included	Included

Source: CMA analysis based on [attributionToken\(\) | Apple Developer Documentation](#), [Verifying an Install-Validation Postback | Apple Developer Documentation](#) and [ATT advantages Apple's ad network. Here's how to fix that. | Mobile Dev Memo by Eric Seufert](#)

97. Media reports suggest the additional data Apple makes available via its Apple Ads Attribution API has two key advantages:

- First, it includes data on the specific ad creative in particular the ID of the ad group,<sup>61</sup> and the ID of the set of ad creatives.<sup>62</sup> Ad creative data is a central component of ad campaign optimisation, without it the ad network cannot know which creatives to keep, change, or drop.
- Second, the Apple Ads Attribution API includes the date of the ad click, and attributes app installs as they happen, unlike with SKAdNetwork.<sup>63</sup> This allows for more granular and timely analysis of install attribution.

98. Meta told us that SKAdNetwork significantly reduces the ability of ad networks and ad tech providers to provide ad attribution and analytics metrics to advertisers as with it ‘the data is restricted, aggregated, delayed in reporting and can only support a limited number of campaigns.’ This reduces the network’s ability to measure ad performance and in turn advertisers’ willingness to pay for ads.

99. Meta also told us that Apple imposes certain limitations to SKAdNetwork, such as the so-called ‘privacy thresholds’. Based on this, when the number of conversions sharing certain characteristics is too low, Apple hides the conversion values (returning ‘null’ conversion values). Meta told us that Apple does not disclose the characteristics it considers or the thresholds that must be reached before Apple discloses conversion values, though the characteristics can include information such as publisher app or ad network. This, in Meta’s view, places smaller publishers at a clear disadvantage since their lower traffic makes their conversions less likely to pass the threshold.

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<sup>61</sup> An ad group is a collection of criteria used to define who sees your ad in App Store search results: see [Ad Groups | Apple Developer Documentation](#).

<sup>62</sup> Mobile Dev Memo, [Apple privileges its own ad network with ATT. What's its privacy endgame? | Mobile Dev Memo by Eric Seufert](#).

<sup>63</sup> Mobile Dev Memo, [ATT advantages Apple's ad network. Here's how to fix that. | Mobile Dev Memo by Eric Seufert](#).

100. It has been reported that changes implemented by Apple mean the share of null can increase suddenly (and differently depending on SKAN versions), creating data losses and uncertainty for advertisers.<sup>64</sup>
101. Meta told us the ad tech industry uses machine learning models to decide which ads to show to a user. For example, these models are trained on a user's past behaviour (they installed Candy Crush Soda Saga from an ad) to predict future behaviour (they might be interested to install Candy Crush Jelly Saga from an ad as well). Because SKAN conversions are not directly linked to a click or an impression, technological partners are unable to use them directly in their training data to link historical impressions to conversions. They can continue to use them at an aggregate level to correct the calibration of models.
102. Snapchat reported lower than expected revenue in an earning call for third quarter of 2021 because of Apple's ATT changes.<sup>65</sup> In the same earning call, Snapchat said that SKAdNetwork, Apple's free replacement for IDFA-based tracking of conversions, worked less well than expected.<sup>66</sup>
103. [In response to CMA questions, we heard] that SKAdNetwork does not report user level data, but only the aggregate number of installs that occur after a click, within a set timeframe. We were also told that both SKAdNetwork and the Apple Ads Attribution API provide less granularity than is otherwise possible (for example, on Android devices or in circumstances where users have agreed to provide authorisation for third-party tracking).

## **How does ATT influence opt-in to data sharing – the choice architecture of the ATT prompt**

104. Choice architecture refers to the contexts in which users make decisions and how choices are presented to them. The literature on behavioural economics and psychology provides extensive evidence supporting the strong impact of choice architecture elements such as framing, pre-set defaults and ordering of options on an individual's decision-making.<sup>67</sup> Specifically, with regards to data

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<sup>64</sup> See [Inside SKAN: SKAdNetwork insights \[Guide\] | AppsFlyer](#) and [iOS 14 & ATT benchmarks \[Report\] | AppsFlyer](#).

<sup>65</sup> The Wall Street Journal (2021), [Snap's Stock Plummets as It Blames Apple's Privacy Changes for Hurting Its Ad Business - WSJ](#).

<sup>66</sup> Seeking Alpha, [Snap Inc. \(SNAP\) CEO Evan Spiegel on Q3 2021 Results - Earning Call Transcript | Seeking Alpha](#).

<sup>67</sup> See Szaszi, B., Palinkas, A., Palfi, B., Szollosi, A., and Aczel, B. (2018) [A Systematic Scoping Review of the Choice Architecture Movement: Toward Understanding When and Why Nudges Work](#). *Journal of Behavioral Decision Making*, 31: 355–366 for a review of empirical evidence on choice architecture interventions.

privacy, there is empirical evidence supporting the role of choice architecture in influencing users' privacy choices.<sup>68</sup>

105. The CMA's final report on the online platforms and digital advertising market study, discussed the importance of the choice architecture of data privacy choice screens and the underlying psychological mechanisms which influence user behaviour.<sup>69</sup> The CMA also proposed certain choice architecture principles ('Fairness by Design') for the design of choice related to users' personal data by digital advertising platforms with strategic market status, to enhance user control over their data.
106. Since the CMA published its digital advertising market study report, others have conducted work considering how data privacy choices can be presented to consumers. For example, a set of experiments conducted by the Behavioural Insights Team (BIT) and Centre for Data Ethics and Innovation (CDEI) tested different ways of presenting privacy and personalisation settings in online contexts.<sup>70</sup> Those experiments found that varying choice architecture elements could substantially impact users' comprehension of consequences and feelings of control.
107. The combined empirical evidence on the impact of choice architecture as well as CMA's past work into data privacy choices strongly suggest that the choice architecture of prompts, including the ATT and Apple's Personalised Ads prompts, can influence user behaviour and thereby opt-in rates to personalised advertising.
108. In this section of the appendix we:
  - describe the choice architecture of the ATT prompt and concerns about its potential influence on user decision-making;
  - set out the alternative designs and choice architecture for the ATT prompt considered by Apple;
  - illustrate the use and choice architecture of pre-prompt screens by third-party app developers that could also influence user decision-making;

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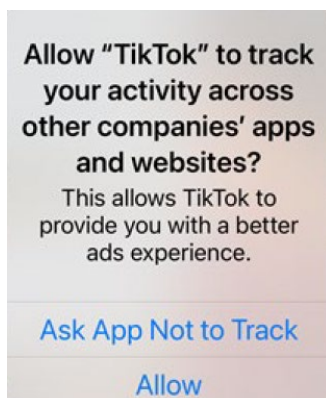
<sup>68</sup> See Adjerid, I., Acquisti, A., & Loewenstein, G. (2019) [Choice Architecture, Framing, and Cascaded Privacy Choices](#). *Management Science* 65(5):2267-2290 and Ioannou, A., Tussyadiah, I., Miller, G., Li, S., Weick, M. (2021) [Privacy nudges for disclosure of personal information: A systematic literature review and meta-analysis](#). *PLoS ONE* 16(8): e0256822.

<sup>69</sup> CMA (2020), Online Platform and Digital Advertising Market Study, Final Report, [Appendix Y](#).

<sup>70</sup> Behavioural Insights Team (2021) [Active Online Choices: Designing to Empower Users](#).

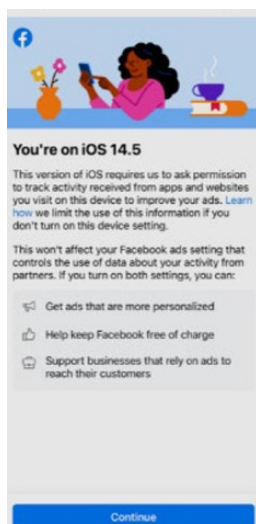
- discuss the choice architecture of Apple’s Personalised Ads prompt, which seeks permission for data sharing with Apple’s own first-party apps, and compare this to the ATT prompt; and
  - discuss the user journey (including number of steps required) for changing privacy preferences using device settings for both third-party apps and Apple apps.
109. In Chapter 7, we discuss some potential demand-side remedies and ask for views including on the potential for principles on the choice architecture for data privacy screens and prompts within mobile eco-systems.
110. Figure I.4 illustrates the basic design of the ATT screen. Key elements of the ATT prompt choice architecture include:
- Developers who wish to access users’ IDFA to serve them with personalised advertising have to surface the ATT prompt individually for each app, asking for permission to ‘track’ users. Developers are able to include their own language in the ATT prompt that explains why they would like to access the users’ data. Developers can display the prompt only once per app at a time of their choosing. For example, developers can choose to display the ATT prompt the first time the app is launched, or they can display it after the user has spent some time using the app and thus, better understand how the app functions and how the developer might use their data.
  - The ATT choice screen includes:
    - a non-customisable prompt in bold text which is set by Apple;
    - below this is a purpose string in non-bold text which can be customised by the third-app party developers; and
    - then the choice buttons to either opt out or into data sharing.
  - In addition to the ATT screen itself, developers are allowed to show their own screens to users in advance of the ATT prompt to describe the purpose and implications of the ATT prompt and why the developer would like to engage in tracking. These screens are not managed by the operating system, and developers have discretion with respect to when, how, and with what frequency they display their own screens (as long as those are otherwise in compliance with the App Store Review Guidelines and Apple developer agreement). Figure I.5 provides an example of such a ‘pre-prompt’ screen.

**Figure I.4: ATT prompt example**



Source: Apple (screenshot taken in July 2021).

**Figure I.5: Pre-prompt screen shown by Facebook before displaying the ATT prompt**



Source: Apple (screenshot taken in July 2021).

### ***Alternative designs of the ATT prompt considered by Apple***

**Figure I.6: Alternative designs considered by Apple for the ATT prompt**

[X]

111. As discussed in Chapter 6, Apple did not provide any research or user testing related to the current ATT design. Apple told us that 'Apple has not identified research specifically relating to user testing or A/B testing carried out by Apple on the above parameters/components/content/language of the ATT prompt'.
112. A document submitted by Apple indicated that Apple had considered alternate designs of the ATT prompt, including designs with different ordering and framing of the choice options, and different language and ordering of choice buttons [X]. Examples of these alternate designs are illustrated in Figure I.6.
113. Our view is that these alternatives for choice architecture would have represented meaningful changes to the ATT prompt with likely impacts on the

opt-in rate for personalised advertising. Some of the options considered by Apple would alleviate potential concerns about the ATT prompt as discussed in our analysis of the present ATT prompt format.

### ***Design and choice architecture of the ATT prompt***

114. In our discussion of the ATT choice architecture, we have considered the evidence submitted, and literature on behavioural science and psychological mechanisms. From these sources we have pulled the key areas where we have concerns that the current choice architecture chosen for the ATT prompt by Apple may not empower users to make effective decisions, and could be designed specifically to influence consumers to opt-out.
115. Below we offer an examination of the choice architecture of the ATT prompt, including the language employed in the prompt and the ordering of the choice options. We also explore the potential influence of the pre-prompt screen on user decision-making.
116. As discussed in Chapter 6, in addition, we have a specific concern that third-party developers cannot offer incentives to users in return for opting into sharing their data including in the ATT prompt.<sup>71</sup>
- Given that developers benefit from users opting-in as it increases the effectiveness of their user acquisition and monetisation, allowing them to offer incentives would enable them to share some of that value with users. This would potentially benefit both users and developers, without restricting user choice. However, as the ICO's guidance makes clear that providing consent to tracking should not be a condition of general access to content, organisations must be careful to ensure that offering incentives to consent does not cross the line into penalising those who do not consent to tracking.<sup>72</sup>
  - Apple told us that the reason for this restriction was that 'gating' functionality in this way could be seen as contradicting various privacy guidance around the world.<sup>73</sup>

### ***ATT Prompt Language***

117. As was described by the CMA's market study into online platforms and digital advertising, the language and description provided are highly relevant

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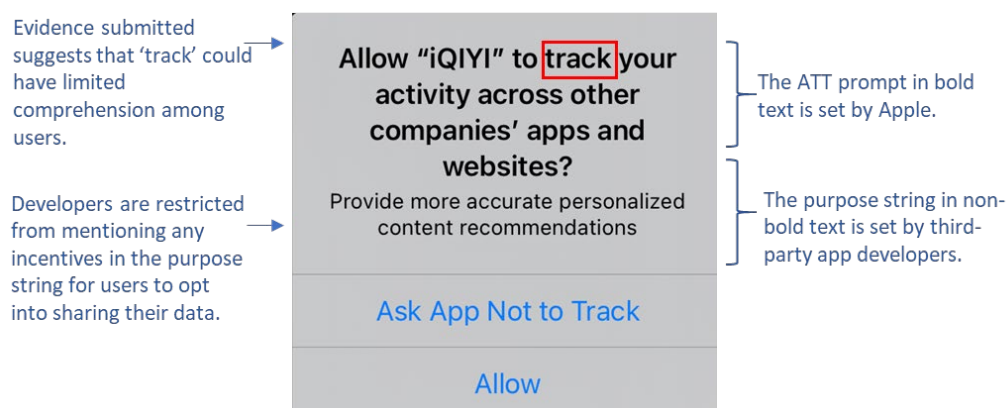
<sup>71</sup> As per App Store Review Guidelines, 3.2.2 (vi).

<sup>72</sup> [ICO, What is valid consent?](#)

<sup>73</sup> It cited in particular European Data Protection Board guidance on GDPR and a statement by the Dutch data protection agency on 'cookie walls'.

elements of a data privacy and personalised advertising prompt. Figure I.7 shows the key areas of language identified within the ATT prompt.

**Figure I.7: Language employed in the ATT prompt**



Note: Screenshot taken on iPhone XR running iOS 15.1 in November 2021.

118. We recognise that Apple's use of the word 'track' in the ATT prompt aligns with the ICO's definition of online tracking.<sup>74</sup> However, we have received evidence which raised concerns about user comprehension of the language used in the ATT prompt. In response to our evidence gathering, we have heard the ATT prompt framing is potentially unhelpful as users may not comprehend how the developer will use their data if they choose to opt into sharing their personal data with the developer, and equate 'tracking' with surveillance which includes location, voice, video, etc. Meta, in evidence submitted to us, also noted that prior to the launch of the ATT framework, Meta had expected the wording of the ATT prompt and the negative connotations of the word 'tracking' to discourage users from opting-in.
119. Apple, in evidence submitted to us, argued that the word 'tracking' is commonly used and understood by users to describe the process of identifying and following users across apps and websites. Apple also argued that it has built brand recognition and understanding for the word 'tracking' among Apple users owing to the Intelligent Tracking Prevention feature in Safari, introduced in 2017.
120. A document submitted by Apple also suggests that Apple considers the term 'tracking' may have a negative connotation. In particular, the document suggests the term [X].
121. Apple submitted that, while the ATT prompt, in bold text, is non-customisable, third-party app developers have the option of including a customisable purpose string or byline in the non-bolded narrative text portion of the ATT prompt to explain their reason for requesting access to user data. Apple told

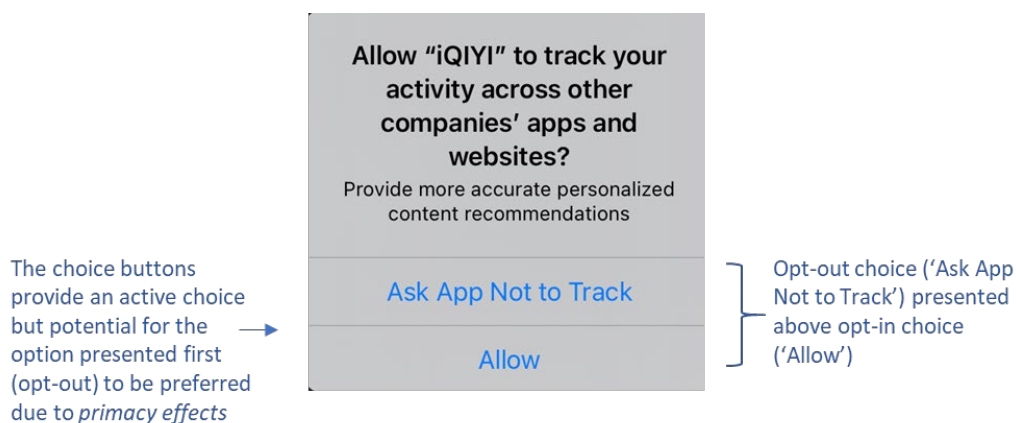
<sup>74</sup> ICO (2021), [Data protection and privacy expectations for online advertising proposals](#).



us that there is no character limits on the purpose string for the ATT prompt, although their Human Interface Guidelines recommend that developers should concisely explain why the app needs to access users' data 'typically in one sentence'.

122. While the non-customisable ATT prompt is in bold text the customisable purpose string is in non-bold text. This could raise issues related to salience as users are more likely to focus on what is salient and immediately visible.<sup>75</sup> Salience of text may be important because, under conditions of limited attention, users tend to rely on the most salient behavioural cues to make decisions.<sup>76</sup>
123. As discussed above, Apple also told us that the ATT framework imposes some restrictions on developers seeking user authorisation to track, including that developers cannot incentivise users (eg with offers of additional in-app content or features) to persuade users to allow tracking. In addition, the ATT prompt, including the purpose string, and any screens developers display in advance of displaying the ATT prompt, must comply with App Store Review Guidelines and Apple developer agreement, meaning that they cannot mention incentives for opt-in.

### ATT choice options




Note: Screenshot taken on iPhone XR running iOS 15.1 in November 2021.

124. The ATT prompt provides an active choice to users with no pre-selected or highlighted option as shown in Figure I.8. However, in the vertical list of choice options, the opt-out choice ('Ask App Not to track') is presented first. This could lead to ordering effects, where the order in which the choices are

<sup>75</sup> Tiefenbeck, V., Goette, L., Degen, K., Tasic, V., Fleisch, E., Lalive, R., & Staake, T. (2018). [Overcoming salience bias: How real-time feedback fosters resource conservation](#). *Management Science*, 64(3), 1458–1476.

<sup>76</sup> Mann, T., & Ward, A. (2007). [Attention, Self-control, and Health Behaviors](#). *Current Directions in Psychological Science*, 16(5), 280–283.

presented to users can influence their decision. Users can display a bias towards selecting the first option ie primacy effect. This can be due to reasons such as cognitive fatigue or serial-position effects on memory ie when likelihood of recalling an item depends on its position in the list.<sup>77,78</sup>

125. The choice buttons in the current format of the ATT prompt differ from some of the alternatives considered by Apple we described above and as shown in Figure I.6. For example, Figure I.6 suggests that Apple had considered different framing and ordering of the choice options, []. These choice architecture alternatives could have resulted in different implications for user behaviour as compared to the current design.
126. Further, we received evidence from Apple setting out that the form of the ATT prompt is consistent with Apple's standard operating-system-level alerts that are available to developers to request access to other user data and resources. In particular, having shorter or smaller text in the choice buttons allows the options to be placed side-by-side instead of stacked on top of each other in standard operating-system-level-alerts on Apple devices.
127. Side-by-side placement or horizontal orientation of the choice options could be an alternative orientation of options. As discussed in Chapter 7, future trialling of new or different versions of remedies can be an important tool for understanding the impacts. In this case, trials of different orientation of choice options could be an important addition to the evidence.

#### *ATT pre-prompt*

128. Prior to showing the ATT prompt, developers can display their own screen ie a 'pre-prompt' which can be used to explain why they are requesting access to users' data. Developers have discretion over the content of these pre-prompts, how they display them and also the number of times they choose to display them, subject to compliance with Apple App Store Review Guidelines and Apple developer agreement.
129. The choice architecture of pre-prompts can be used by developers, short of offering incentives, to persuade users to opt into data sharing. For example, as shown in Figure I.9, Twitter in its pre-prompt states that allowing tracking will ensure that users are shown relevant ads. A guide on Appfigures, an

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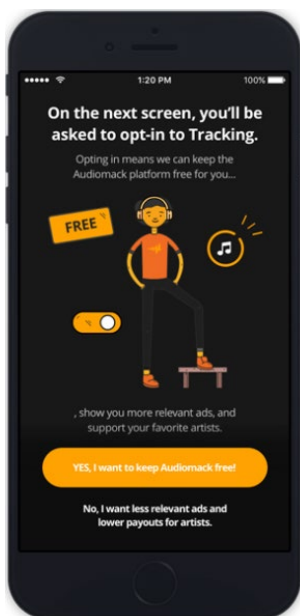
<sup>77</sup> Feenberg, D., Ganguli, I., Gaulé, P., & Gruber, J. (2017). [It's Good to Be First: Order Bias in Reading and Citing NBER Working Papers](#). *The Review of Economics and Statistics*, 99(1), 32-39.

<sup>78</sup> Users may also display a bias towards the last choice option ie recency effect. However, there is evidence supporting that when faced with a binary choice (such as opt-out vs opt-in choices in the ATT prompt), the choice which is presented first by the choice architecture, and is thus more reachable, is likely to be favoured. See Bar-Hillel, M., Peer, E., & Acquisti, A. (2014). ["Heads or tails?"—A reachability bias in binary choice](#). *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 40(6), 1656–1663.

analytics and insights platform for app developers, offers recommendations for the pre-prompt format such as describing the ATT prompt, highlighting benefits of sharing data with developers, and using positive language.<sup>79</sup> Notably, Audiomack, a music streaming app, tested a variant of a pre-prompt screen which mentioned that users opting-in will allow the platform to remain free (Figure I.10), resulting in a 64% opt-in rate.<sup>80</sup>



Source: Apple (screenshot taken in July 2021).



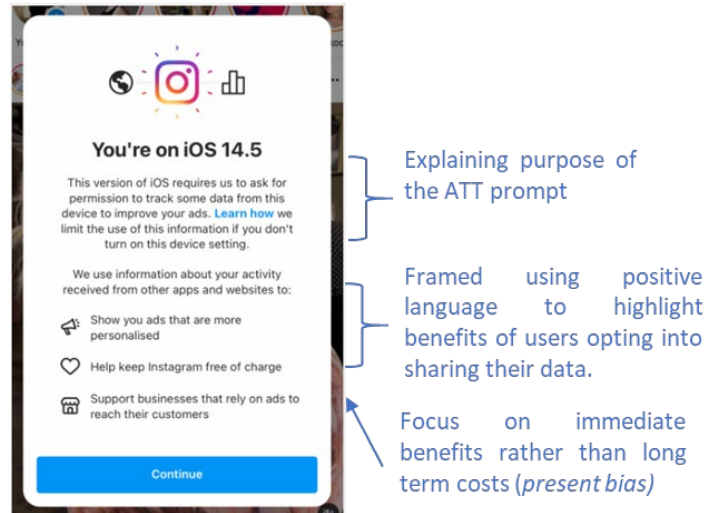
Source: AdExchanger<sup>81</sup>

<sup>79</sup> How to Craft the Perfect ATT (App Tracking Transparency) Prompt and Pre-Prompt Copy ASO Tools and App Analytics by Appfigures.

<sup>80</sup> Here's How Music App Audiomack Got 64% Of its Users To Opt Into iOS Ad Tracking | AdExchanger.

<sup>81</sup> Here's How Music App Audiomack Got 64% Of its Users To Opt Into iOS Ad Tracking | AdExchanger.

130. Figure I.11 illustrates a further pre-prompt screen captured by the MyTracker blog and it has been illustrated with the choice architecture used.



Source: MyTracker<sup>82</sup>

131. Across examples of pre-prompt screens, we observed:

- They can provide useful information to users to help them make effective decisions.
- However, it appears there are no barriers to the pre-prompt being positively framed using specific language, to highlight the benefits of users opting-into sharing data. For example, describing a benefit to users of being served with 'relevant' ads, which is a form of language the CMA has previously raised concerns about when used to discuss data privacy choices.<sup>83</sup> Using language with specific positive connotations could influence users to favour the opt-in choice, but the underlying meaning of the choice may not be comprehended by users.
- Additionally, the pre-prompt can, without constraints, be used to highlight the immediate benefits of opting-in with no reference to ongoing implications of opting-into personalised advertising. This could reinforce present biased preferences (ie the tendency to attach greater relative weight to costs and benefits that are closer to the present<sup>84</sup>) which can

<sup>82</sup> [How to Optimize Your iOS 14.5 Update Strategy with Pre-Permission Prompts | MyTracker Blog](#)

<sup>83</sup> CMA (2020), [Appendix Y](#), Online platforms and digital advertising market study.

<sup>84</sup> O'Donoghue, T., & Rabin, M. (1999). [Doing It Now or Later](#). *American Economic Review*, 89(1), 103-124.

then cause users to focus on the immediate benefits of divulging data and overlook any future implications.<sup>85</sup>

### *Recommendation for alternative ATT prompt design*

**Figure I.12: [Alternative wording for] the ATT prompt**

[✕]

132. In response to CMA questions, alternative wording utilising plain language techniques was recommended.<sup>86</sup> For instance it was suggested to replace the word 'track' with 'use' and add 'to optimize your experience' as a purpose string displayed below the prompt.
133. However, we have received a document from Apple that raised concerns that 'optimize' wouldn't be comprehended by users as meaning their personal data being linked and applied to serve them with personalised advertising. Apple also noted that [✕]. The CMA in its online markets and digital advertising market study final report raised concerns about the use of unrelated positive descriptions of sharing data (eg being served with 'relevant' advertising).<sup>87</sup>

### ***User journey for centrally disabling or enabling apps from showing the ATT prompt***

134. Some users may have a strong preference on data privacy and wish to stop an ATT prompt being shown for every app they visit. Other users may want to revisit their previous choice and want to switch their preference subsequently.
135. Users of Apple devices have the option to stop third-party app developers from showing the ATT prompt by disabling 'Allow Apps to Request to Track' in Privacy Settings under Tracking. Or alternatively, users can enable this setting to allow apps to request permission for tracking.
136. 'Allow Apps to Request to Track' is enabled by default for new users and for existing users who had Limit Ad Tracking disabled before iOS 14.
  - If the user disables 'Allow Apps to Request to Track' then any app that attempts to surface the ATT prompt will be blocked from doing so and will be informed that the user has requested not to be tracked.

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<sup>85</sup> John, L. (2015). [The Consumer Psychology of Online Privacy: Insights and Opportunities from Behavioral Decision Theory](#). In M. Norton, D. Rucker, & C. Lamberton (Eds.), *The Cambridge Handbook of Consumer Psychology* (Cambridge Handbooks in Psychology, pp. 619-646).

<sup>86</sup> Plain language (or plain writing or Plain English) is communication which users can understand the first time they read or hear it. See [What is plain language? | plainlanguage.gov](#).

<sup>87</sup> CMA (2020), [Appendix Y](#), Online platforms and digital advertising market study.

- Disabling 'Allow Apps to Request to Track' stops all apps, other than the ones the user has previously given permission to track, from accessing the device's IDFA.
- The user journey for disabling 'Allow Apps to Request to Track' is illustrated in Figure I.13. If the user has given permission to track to any app through the ATT prompt, and then afterwards disabled 'Allow Apps to Request to Track', the user will be able to select either 'Allow Apps to Continue Tracking' or 'Ask Apps to Stop Tracking' for those apps as shown in Figure I.13.
- The journey for users to centrally disable apps from asking permission to track involves a process with around six steps, including scrolling. We are concerned that the additional effort involved could discourage users from engaging with the centralised control. Apple told us that they did not commission any research on expected user engagement with the centralised control for disabling app developers from showing the ATT prompt.

Figure I.13: User journey on iPhones to centrally disable apps from asking permission to track users



Source: CMA

Note: Screenshots taken on iPhone XR running iOS 15.1 in November 2021.

## Summary and conclusions on the choice architecture of the ATT prompt and pre-prompt

137. The ATT choice screen provides users with an active choice to opt into sharing their data with third-party app developers. This is a step towards enhancing users' control over their data. We do, however, have concerns that the current choice architecture of the ATT prompt and pre-prompt, may negate the extent to which ATT empowers users to make effective choices about their data.
138. Table I.2 summarises our concerns with the choice architecture of the ATT prompt and the pre-prompt screens.

**Table I.2 Choice architecture of the ATT prompt and pre-prompt screen**

Design element	Description	Behavioural biases and psychological mechanisms
<b>ATT prompt</b>		
Language	The ATT screen includes a non-customisable prompt ('Allow [developer] to track your activity across other companies' apps and websites?') in bold text followed by a customisable purpose string or byline (subject to constraints such as no incentives) in non-bold text.	<b>Framing:</b> We have received evidence from developers suggesting that the term 'track' used in the ATT prompt carries negative connotations. A document submitted by Apple also suggests that Apple considers the term 'tracking' may have a negative connotation. In particular the document suggests the term [🔍]. <b>Salience:</b> The salience of the bold text might draw users' attention more towards the non-customisable prompt compared to the customisable purpose string.
Choice Options	The ATT prompt provides a vertical list of choice options to users where the opt-out choice ('Ask App Not to track') is presented above the opt-in choice ('Allow').	<b>Ordering effects:</b> Users can be more likely to pick the opt-out choice due to primacy effects, ie tendency to favour the option presented first.
Incentives	Third-party developers cannot offer incentives to users for opting into sharing their data.	<b>Incentives</b> are a key behavioural lever and can illustrate the value of users' data to them thereby allowing them to make an effective decision.
<b>ATT pre-prompt</b>		
Language	Prior to showing the ATT prompt, developers can display their own screen, ie a 'pre-prompt' which can be used to explain the purpose of users opting into sharing their data.	<b>Framing:</b> The pre-prompts can be framed using positive language highlighting the benefits of opting into sharing data with third-party developers. This can influence users to favour the opt-in choice when the ATT prompt is displayed.



		<p><b>Present bias:</b> The pre-prompt language can be used to focus users' attention on immediate benefits of sharing data such as relevant ads and overlook any future costs, a phenomenon called present bias, ie user tendency to assign greater relevant weight to benefits and costs that are closer to the present.</p>
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139. We also note that the user journey for centrally disabling (or enabling) apps from showing the ATT prompt involves multiple steps, potentially creating unnecessary barriers and deterring users from changing the default setting.

***Choice architecture of Apple's Personalised Ads prompt and comparison with ATT prompt***

140. As discussed above, with the launch of iOS 15, Apple has started surfacing a choice screen to users asking permission to enable personalised ads for their Apple ID.<sup>88</sup> Opting into personalised ads will allow Apple to show personalised advertising in the Apple App store as well as Apple News and Stocks apps. Personalised ads was previously enabled by default for Apple owned apps, unless the user had enabled Limit Ad Tracking before iOS 14.

141. Starting with devices running iOS 15, the Personalised Ads prompt is displayed to new users when the App Store is launched for the first time. For existing users, whose devices is set to personalised ads on, the prompt is displayed when App Store is launched after updating their device to iOS 15. In later iOS 15 releases, the Personalised Ads prompt will surface upon first launch of the News or Stock apps, if the user has not launched App Store before that.

142. The Personalised Ads prompt consists of a heading ('Personalised Ads') in bold text, followed by information on personalised advertising in non-bold text, and finally the choice buttons 'Turn on Personalised Ads' and 'Turn off Personalised Ads'. An illustration of the Personalised Ads prompt is provided in Figure I.14.

143. We welcome Apple's introduction of the personalised ads screen as potentially empowering users to make choices on data privacy. We, however, have four specific concerns:

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<sup>88</sup> [iOS 15 now prompts users if they want to enable Apple personalized ads, after it was previously on by default-9to5Mac.](#)

- The choice architecture of the personalised ads screen may have features that seek to strongly influence users to opt into data sharing and therefore does not empower users to make effective choices.
- The choice architecture of the personalised ads screen is significantly different to the choice architecture we describe for the ATT prompt.
- The user journey for changing the personalised ads settings is around 6 steps including scrolling which may create a barrier to users revisiting their choice.
- Apple has provided little explanation on how the Personalised Ads prompt design was finalised including confirming that ‘No research or user testing and A/B testing related to these design features was carried out’.

Figure I.14: Illustration of Apple's Personalised Ads prompt



Source: Apple

### *Choice architecture of Apple's Personalised Ads prompt*

144. We are concerned that the choice architecture of Apple's Personalised Ads prompt may push users towards opt-in for personalised advertising in a way not consistent with empowering users to make effective choices. The choice architecture of the prompt is illustrated in figure I.15 and summarised in Table I.3.

145. Our primary concern is that the ordering of the opt-in choice first, vertically above the opt-out choice, could result in users favouring the opt-in choice over the opt-out choice. In addition, found that the text description in the prompt is framed entirely positively about the benefits of opting into data sharing which may not empower users to make effective choices.

Figure I.15: Choice architecture of Apple's Personalised Ads prompt

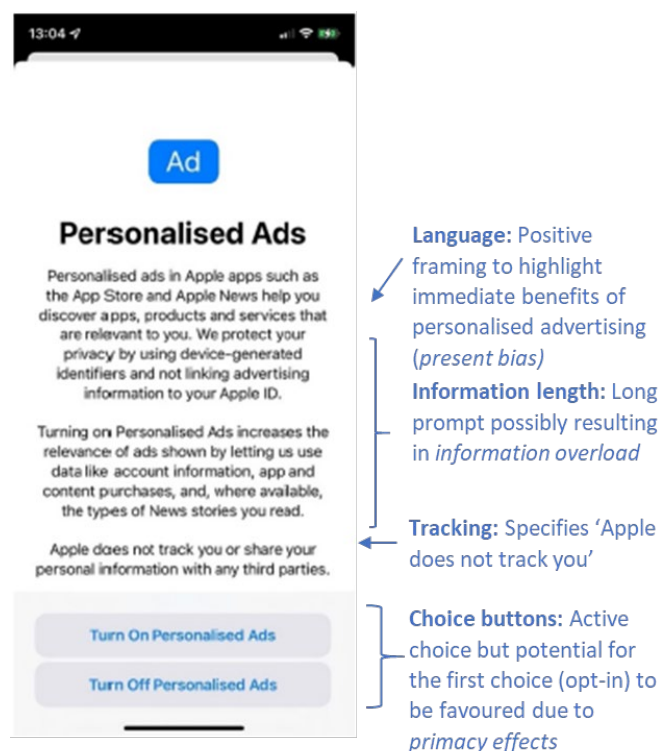


Image source: Apple; Analysis: CMA

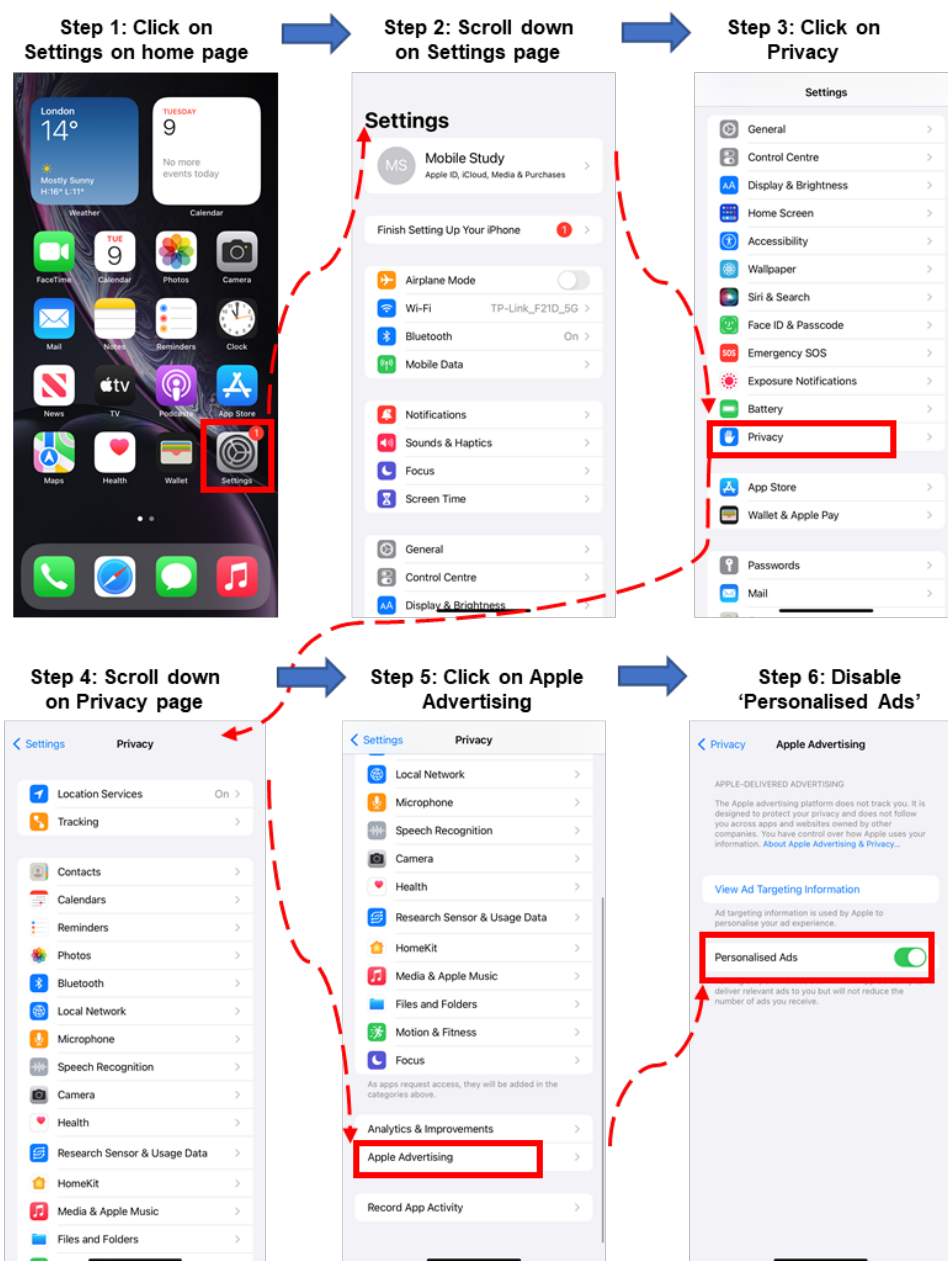
Table I.3 Choice architecture of Apple's Personalised Ads prompt

Design element	Description	Choice architecture concerns
Choice options	The Personalised Ads prompt provides a vertical list of choice options to users where the opt-in choice ('Turn on Personalised Ads') is presented above the opt-out choice ('Turn off Personalised Ads').	<b>Ordering effects:</b> Users could display a preference towards the opt-in choice due to primacy effects ie tendency to favour the option presented first.
Language and information length	The Personalised Ads prompt mentions the purpose and benefits of enabling personalised ads and specifies that 'Apple does not track you'.  The Personalised Ads prompt presents detailed information split over 3 paragraphs.	<b>Framing:</b> The prompt is framed using positive language to highlight the benefits of opting into personalised advertising. <b>Present bias:</b> Positive framing of the Personalised Ads prompt could influence users to focus their attention on the immediate benefits of personalised advertising while paying less attention to any future implications of sharing data, owing to present biased preferences. <b>Information Overload:</b> Due to limited user attention, the long text in the Personalised Ads prompt could cause information overload, reducing the user's ability to make an effective decision. <sup>89</sup>

## User journey for centrally changing Personalised Ads setting for Apple Apps

146. Users have the option to centrally disable or enable personalised ads by navigating to Apple Advertising under Privacy settings.<sup>90</sup> The user journey for this illustrated in Figure I.16. The process for centrally disabling or enabling personalised ads involves around 6 steps, including scrolling. The additional effort involved in the process could potentially discourage users from engaging with it.

Figure I.16: User journey for centrally disabling personalised ads for Apple apps on iPhone



Source: CMA

Note: Screenshots taken on iPhone XR running iOS 15.1 in November 2021.

<sup>89</sup> Persson, P. (2018). Attention manipulation and information overload. *Behavioural Public Policy*, 2(1), 78-106.

<sup>90</sup> Control personalised ads on the App Store, Apple News and Stocks – Apple Support (UK).

### *Differences between ATT and Apple's Personalised Ads prompt*

147. Apple's Personalised Ads prompt employs a different choice architecture compared to the ATT prompt. Apple told us that 'The Personalized Ads prompt does not look like the ATT prompt because Apple does not engage in tracking to deliver Personalised Ads'.
148. We highlight below the differences in choice architecture between the ATT and Apple's Personalised Ads prompts. Specifically, we identify choice architecture differences which could influence users to opt-in to sharing data for Apple's own apps whilst potentially influencing users to opt-out from sharing data within the ATT prompt.
149. Our concerns about the differences in choice architecture and thereby potential impact on opt-in/opt-out choices are primarily:
  - The ordering of options in the two privacy prompts differ from each other. In the ATT prompt, the option to opt-out from personalised advertising is presented at the top vertically. In Apple's Personalised Ads prompt, the option to opt-in to personalised advertising is presented at the top vertically. As discussed above, primacy effects suggest that the option presented at the top may be favoured by users.
  - The format and content of the text shown in the prompts are unlike each other and these differences may materially influence choice.
150. Table I.4 summarises the choice architecture concerns and behavioural mechanisms underpinning these. The sections above provide further detail and references for each mechanism.
151. As discussed in Chapter 7, we are seeking views on whether there are principles for the choice architecture of data privacy prompts and choice screens that should be applied across mobile ecosystems.

**Table I.4: Summary of differences in the choice architecture of the ATT prompt and Apple's personalised Ads prompt**

	<b>ATT prompt</b>	<b>Personalised Ads prompt</b>
<b>Ordering effects</b>	The opt-out choice ('Ask App Not to Track') is presented above the opt-in choice ('Allow') which could possibly enhance users' likelihood to opt-out due to primacy effects.	The opt-in choice ('Turn on Personalised Ads') is presented above the opt-out choice ('Turn off Personalised Ads') which could possibly enhance users' likelihood to opt-in due to primacy effects.
<b>Framing</b>	The prompt is framed as providing a choice on whether to allow an app to 'track' the users. Evidence submitted to us suggests users may not comprehend the meaning of the language used, particularly the word 'track'.	The prompt is framed as allowing users a choice on 'personalised advertising' and then describes the benefits of personalised advertising.
<b>Information overload</b>	The information provided in the prompt is brief.	The prompt is substantially longer. Thus, it is possible for users to miss key details due to information overload.
<b>Salience of key messages</b>	The non-customisable prompt presented in bold text is likely to draw the user's attention more than the customisable purpose string below the prompt due to salience.	All the text presented except for the title is equally salient.