Prof. Antonio Rangel

Behavioral Economics Expert
What are Defaults?

- A default is an option pre-selected by a third party.

<table>
<thead>
<tr>
<th>Tip</th>
<th>18%</th>
<th>20%</th>
<th>22%</th>
<th>25%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$3.47</td>
<td>$3.85</td>
<td>$4.24</td>
<td>$4.82</td>
</tr>
</tbody>
</table>

- Default is automatically chosen unless the consumer makes an explicit decision to select another alternative.
Assignment

**Assignment 1:** Evaluate the impact of Google’s search defaults.

**Assignment 2:** Compare the impact of search defaults on mobile devices versus personal computers.

**Assignment 3:** Evaluate the impact of defaults on consumers’ decisions regarding privacy in search.
Key Conclusions

**Conclusion 1:** Search engine defaults generate a sizable and robust bias towards the default.

**Conclusion 2:** Search engine default effects have stronger effects on mobile devices than on personal computers.

**Conclusion 3:** Power of defaults also affects consumers’ privacy decisions in search.
Defaults Strongly Influence Choice

401(k) plans: Introducing opt-in default increased participation from 37% to 86%.

End-of-life care: 77% of patients chose comfort-oriented directive when default, versus 43% when life extension was the default.

Organ Donation:

- In Austria, where citizens were registered as organ donors by default, 99% were registered donors.
- In neighboring Germany, where citizens had to affirmatively register, only 12% were registered donors.
Google’s Behavioral Economics Team

**Case study:** Initially, advertisers entered maximum daily budgets in an interface with no default setting.
Case study (cont.): Google experimented with a $10 default to increase spending among advertisers.
## Google on the “Power of Defaults”

<table>
<thead>
<tr>
<th>Year</th>
<th>Source</th>
<th>Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>Presentation to Hal Varian</td>
<td>“Power of defaults.” “Default home page can be a powerful strategic weapon in the Search battle.”</td>
</tr>
<tr>
<td>2014</td>
<td>Android Top Insights</td>
<td>“The power of default apps. Users rarely stray from pre-loaded apps provided by GMS core, carrier, and/or OEM bundle.”</td>
</tr>
<tr>
<td>2015</td>
<td>Code Red (Apple) Update</td>
<td>“Our brand is in good standing among iPhone users . . . but our position is still very vulnerable if defaults were to change.”</td>
</tr>
<tr>
<td>2016</td>
<td>Global Partnerships Search Strategy</td>
<td>“There’s tremendous power in the default OS access points but it’s pay to play. . . . There is no substitute for the default access points: we should continue to explore broad default access across all OS (including newer and emerging access points).”</td>
</tr>
<tr>
<td>2017</td>
<td>Email from David Tar (Google Technical Writer)</td>
<td>“I think default options presented (in anything from finance to gaming) are very powerful, and will probably end up being what most people choose (out of lack of knowledge about customization, or convenience.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Company</th>
<th>Redacted</th>
<th>(Location, Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td></td>
<td>worldwide, 2020</td>
</tr>
<tr>
<td>Android</td>
<td></td>
<td>U.S.-only, 2020</td>
</tr>
<tr>
<td>Firefox</td>
<td></td>
<td>worldwide, 2021</td>
</tr>
</tbody>
</table>

Source: Whinston Initial Report ¶ 508 (citing APLGOOGDOJ-00013049); Whinston Reply Report Fig. 88 (Android); Mozilla Foundation 2021 Audited Financial Statement
Google Apps Encounter “Power of Defaults”

2019 Google Podcasts Presentation:

Secondly, if we take another view, Apple Podcasts has amassed a majority market share on iPhones. There are other podcasting apps what we believe offer an equivalent or better user experience, but Apple Podcasts still has a high share over all other apps combined. This goes to show the power of the default. There are many examples of other apps where a preinstalled app in premium placement is the primary driver of user. (For example, Google Photos. We also know the reverse is true - Google Maps illustrates how even a superior product with great brand recognition can struggle to gain share). We also see from consumer surveys that podcasting apps are incredibly sticky.

Source: UPX 938, at Bates 776

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Google’s Search Engine Defaults

Apple iPhone

Android Phone

Firefox Browser

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Conclusion #1

- Search engine defaults generate a sizable and robust bias towards the default.
- Most search engine choice is implicitly driven by habit.
- Behavioral biases and choice friction further strengthen Google’s defaults.
# Habit & Implicit Search Engine Choice

<table>
<thead>
<tr>
<th>Year</th>
<th>Event/Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>Thoughts on Google v. Microsoft (Hal Varian)</td>
</tr>
<tr>
<td></td>
<td>“Recommendation. Get users addicted to our interface and tools, particularly those where we have intellectual property protection.”</td>
</tr>
<tr>
<td>2015</td>
<td>iOS App Switching</td>
</tr>
<tr>
<td></td>
<td>Listing “Habit/Regular Usage” as the #1 reason users choose Chrome, the Google Search application, and Safari.</td>
</tr>
<tr>
<td>2016</td>
<td>Search/Assist Presentation</td>
</tr>
<tr>
<td></td>
<td>Redacted</td>
</tr>
<tr>
<td></td>
<td>“Changing behavior is hard, displacing defaults even harder.”</td>
</tr>
<tr>
<td>2022</td>
<td>Marketing Plan</td>
</tr>
<tr>
<td></td>
<td>“[T]he power of habit drives many users to stick with Apple’s Spotlight and Safari.”</td>
</tr>
<tr>
<td>March 23, 2022</td>
<td>Former Google SVP and Neeva CEO Sridhar Ramaswamy</td>
</tr>
<tr>
<td></td>
<td>“People are creatures of habit, and if you interject yourself into a habit, good things will happen.” “Most people settle on - you know, one mechanism to do things and - so what is the default within that mechanism is incredibly powerful for establishing market share.”</td>
</tr>
</tbody>
</table>


**REDACTED FOR PUBLIC FILING**
Habits & Rare Default Changes

2005 Google Letter to Microsoft

How the Default is Changed

The problems with the default setting are further compounded by how changes to the default are handled. As you know, most end users do not change defaults. And even the few who might try to make a change from the drop down menu in IE7 will be surprised to learn that their choice will revert to the original default the next time they start IE7. Making changes in the drop down menu temporary rather than permanent differs from normal convention and is especially likely to mislead and confuse end users. Undoubtedly, of the tiny fraction of end users who try to change the default, many will become frustrated and simply leave the default as originally set (in all likelihood to MSN Search in light of Microsoft’s previous setting of the default).
Cognitive Effort & Explicit Search Engine Choice

To change the search engine default, users must:

- Be aware there is a default search engine.
- Discover alternatives.
- Learn the steps necessary to change or evade the default.
- Implement the steps.
Choice Friction Matters

Google’s Behavioral Economics Team, 2021

#1: Actionability and making the best choice the easiest

Reducing friction

Seemingly small friction points in user experiences can have a dramatically disproportionate effect on whether people drop or stick. Reducing friction can also create delight and immediate value.

Status Quo Bias

Inertia is the path of least resistance. People tend to stick with the status quo, as it takes more effort to make changes. Given this, set the default option wisely.
Choice Friction Matters (cont.)

Difficult process (friction)

If you start by thinking that thinking is hard, that people have lots of things to do, and that each barrier in terms of time attention, and demand for thinking is 10X what you think it is — this will be a good start.

For example, starting a signing process by asking people “What do you want to advertise” might create higher friction that one would imagine.

If this is the case, you want to think about each step, as small as it might be, and see if there is a way to eliminate it, delay it, simplify it, default it.
Google prevents Samsung and other Android partners from

Redacted

(2017)

Redacted

Redacted

Redacted

REDACTED FOR PUBLIC FILING
Google stopped Samsung from

Redacted

(2018)

---------- DO NOT COPY -- Notification of breach - Note #3 ----------

To: Andrew Hong (Redacted@business.com), Steve Lee (Redacted@business.com)
Cc: Redacted@business.com, Redacted@business.com, Redacted@business.com, Redacted@business.com

From: Helen Tsao

Subject: Notice of RSA Section 2.4 violation - Notice #3

Dear Andrew and Steve,

On February 10, 2018, we discovered that Samsung used a Client ID, of which Google pays Samsung Shared Net Ad Revenue, on a Samsung device not qualified for revenue share in violation of Section 2.4 of the Google Mobile Revenue Share Agreement ("RSA") dated July 1, 2017. The details of the Device Model are below:

Redacted

Source: UPX 149, at Bates 062.001-003

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Steps to Change the Android Search Widget
Replacing Google Search Widget on Android 12

1. Launch the Play Store App
2. Search for Bing in Search Bar
3. Tap on Install to Download Application
4. Tap Home Button to Exit Play Store App
5. Long Touch Home Button to Return to Home Screen
6. Tap Widget Button
7. Choose Bing in List of Widgets
8. a.) Long Press Bing Widget Style / b.) Tap Add
9. Long Press Google Widget
10. Tap Remove
Replacing Google Search Widget on Android 12

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10. Tap Remove
<table>
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<tbody>
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<td>9</td>
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### Replacing Google Search Widget on Android 12

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<tbody>
<tr>
<td>1</td>
<td>Launch the Play Store App</td>
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<td>Search for Bing in Search Bar</td>
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<td>3</td>
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<td>4</td>
<td>Tap Home Button to Exit Play Store App</td>
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<tr>
<td>5</td>
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<tr>
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<td>Tap Widget Button</td>
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<td>7</td>
<td>Choose Bing in List of Widgets</td>
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<tr>
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<td>10</td>
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# Replacing Google Search Widget on Android 12

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### Replacing Google Search Widget on Android 12

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<td>2</td>
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<td>Tap Home Button to Exit Play Store App</td>
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</tr>
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# Replacing Google Search Widget on Android 12

**Step 5**

<table>
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<td>Launch the Play Store App</td>
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<td>2</td>
<td>Search for Bing in Search Bar</td>
</tr>
<tr>
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<td>Tap on Install to Download Application</td>
</tr>
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<td>Tap Home Button to Exit Play Store App</td>
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<tr>
<td><strong>5</strong></td>
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<td>Tap Widget Button</td>
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<td>7</td>
<td>Choose Bing in List of Widgets</td>
</tr>
<tr>
<td>8</td>
<td>a.) Long Press Bing Widget Style / b.) Tap Add</td>
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<tr>
<td>9</td>
<td>Long Press Google Widget</td>
</tr>
<tr>
<td>10</td>
<td>Tap Remove</td>
</tr>
</tbody>
</table>
Step 6

Replacing Google Search Widget on Android 12

1. Launch the Play Store App

2. Search for Bing in Search Bar

3. Tap on Install to Download Application

4. Tap Home Button to Exit Play Store App

5. Long Touch Home Button to Return to Home Screen

6. **Tap Widget Button**

7. Choose Bing in List of Widgets

8. a.) Long Press Bing Widget Style / b.) Tap Add

9. Long Press Google Widget

10. Tap Remove
## Replacing Google Search Widget on Android 12

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Launch the Play Store App</td>
</tr>
<tr>
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1. Launch the Play Store App
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5. Long Touch Home Button to Return to Home Screen
6. Tap Widget Button
7. Choose Bing in List of Widgets
8. a.) Long Press Bing Widget Style / b.) Tap Add
9. Long Press Google Widget
10. Tap Remove
Reactivating Bing Search Widget on Android 12

1. Launch the Play Store App
2. Search for Bing in Search Bar
3. Tap on Install to Download Application
4. Tap Home Button to Exit Play Store App
5. Long Touch Home Button to Return to Home Screen
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**REDACTED FOR PUBLIC FILING**
Replacing Google Search Widget on Android 12

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## Market Evidence: Mobile

**Mobile device examples** of sizeable default effects:

<table>
<thead>
<tr>
<th>Logo</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="apple_maps.png" alt="Apple Maps" /></td>
<td>Apple Maps Default Switch</td>
</tr>
<tr>
<td><img src="amazon_fire.png" alt="Amazon Fire" /></td>
<td>U.S. Tablet Comparison</td>
</tr>
<tr>
<td><img src="yandex.png" alt="Yandex" /></td>
<td>Russian Choice Screen</td>
</tr>
</tbody>
</table>
Mobile (iOS): 2012 Apple Maps Default Switch

- Apple Maps default became the dominant iPhone maps application despite quality problems.

  “Google Maps illustrates how even a superior product with great brand recognition can struggle to gain market share” against default option.

- Google uses the Apple Maps episode to model expected revenue loss on iPhones and iPads, in the event Apple were to switch the Safari search default.

Source: UPX 938, at Bates 776; UPX 142, at Bates 886
Mobile (iOS): Google “Code Red” Projections

Redacted

Redacted

Redacted

Source: UPX 148, at Bates 826
Mobile: U.S. Tablet Comparison

amazon fire

Default in Silk Browser: Bing

Default in Safari Browser: Redacted

iPad

Default in Safari Browser: Google

Default in Safari Browser: Redacted

Source: UPX 945, at Bates 408 (Amazon Fire); Whinston Initial Report, ¶ 852 & Figure 142 (Apple iPad)
2017 Russia Choice Screen: Android Mobile Phones

Google’s Russia Search Share on Android Devices

Redacted

Source: Yandex Radar

Source: Whinston Initial Report ¶ 953 & Figure 168
2017 Russia Choice Screen: Across Devices

Google’s Russia Search Share by Device Type

Russian Choice Screen Introduced

Redacted

Source: Yandex Radar

Source: Whinston Initial Report § 954 & Figure 169

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Behavioral Economics of Defaults

Status-quo bias

“Defaults: People tend to stick with the status quo, as it takes more effort to make changes. Given this, set the default option wisely.”

“When the decision is unclear, people go with the default.”

Loss Aversion

“When making decisions big and small, people tend to overwhelmingly pick the default option. . . . Deviating from the default induces loss aversion . . .”

Source: UPX 103, at Bates 214; IRLABS 001608, at Bates 625; UPX 985, at Bates 960
App Stores – Google Documents

Led by famed economist [Redacted], our team of behavior experts work to transform Google’s product & marketing strategy by applying the principles of behavioral economics (BE) like...

Redacted: search is “antithetical” to how people think about apps — people don’t necessarily want to go back and open a separate thing to search
Mitchell Baker  
CEO, Mozilla

“[M]erely having an app in the app store is a very difficult way to compete with the preloaded defaults . . . . Because each person who gets that phone has to make a conscious decision to go through a lot of work to get to your product.”
## Mobile (Android): European Choice Screen

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
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<td>Redacted</td>
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</tr>
<tr>
<td>Spain</td>
<td>Redacted</td>
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</tr>
</tbody>
</table>

Source: Whinston Initial Report Figure 173
Redacted: The reason the financial impact is not shifting based on the placement of Google in the choice screen is because the assumptions we used in the model are based on brand recognition (using queries as a proxy) - considering this is what the assumption is meant to capture, the position wouldn't matter as much as the recognition would. There could be benefits to having it show up first (first thing a user sees) or possibly last (so it's easier to click from where your thumb normally is) but we've given this a bit of thought and, given the unknowns, the current assumption is likely unchanged by position.

Separately for RU, there was a choice screen there. However, we think this would not be a good comparable because Yandex has a much higher presence in RU than Non-Google search engines have in the EEA. Ultimately, it's a similar choice screen process, but in an extremely different competitive landscape that would not be close to EEA.
Conclusion #2

Search engine defaults have stronger effects on mobile devices than on personal computers.
## Google Agrees Defaults are More Powerful in Mobile

<table>
<thead>
<tr>
<th>Year</th>
<th>Event/Team</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>Search Finance Team</td>
<td>Redacted</td>
</tr>
<tr>
<td>2016</td>
<td>Apple scenarios</td>
<td>“Mobile Defaults: Defaults have more prominence in mobile due to screen size and UI.”</td>
</tr>
<tr>
<td>2018</td>
<td>iOS Search Strategy</td>
<td>“People are much less likely to change default search engine on mobile.”</td>
</tr>
<tr>
<td>2021</td>
<td>What Would Apple Do?</td>
<td>Redacted</td>
</tr>
</tbody>
</table>

Source: UPX 84, at Bates 728; UPX 142, at Bates 886; UPX 139, at Bates 119; UPX 148, at Bates 826
“On a mobile platform more than anywhere else, even more than on the PC, default is the only thing that matters.”

Rik van der Kooi
Corporate VP, Microsoft
Market Evidence: Personal Computers

**Personal computer examples** of sizeable default effects:

- **Firefox Browser Default Switch**
- **Windows PC Search Shares**
PCs: 2014 & 2017 Firefox Default Switches

Search Engine Shares in the Firefox Browser in Personal Computers in the U.S.

Redacted

Source: Whinston Initial Report ¶ 869 & Figure 150
PCs: Default Effects Across Operating Systems

Apple’s Mac Computers

Windows PC Computers

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Roughly 7-fold Default Effect

Source: Whinston Initial Report ¶ 851, Figure 142

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Conclusion #3

- Defaults bias consumers’ privacy decisions in search.
- Google’s default privacy settings present significant choice friction for users who may prefer less data collection.
As for DDG, it's currently default in 4 geos: Germany, Ireland, Australia, and New Zealand. Although we don't track/identify our users, we have recently started anonymously sampling browsers so that we have some limited aggregated data to analyze. The data is very clear: default is sticky and very powerful. From these anonymous data sets, we see that the default (DDG in these geos) remains default on at least 80% of machines (in some of those geos, significantly higher). This data is corroborated by what we're seeing with Qwant, which we have set as default in France and is seeing similarly high usage. We'd love to go to market with a strong message of partnership between Yahoo/OneSearch & Brave with Yahoo/OneSearch as default and see what we can do.
Apple App-Tracking Prompts

- In April 2021, Apple introduced choice screen for data tracking by applications.

- “Don’t Allow” selected by 80%+ after one year.

- Removal of tracking default cost Facebook roughly $10 billion.

Source: UPX 8086 at Bates 384; Meta Feb. 2, 2022 Earnings Call (iOS privacy changes “on the order of $10 billion”).
Choice Friction & Google Privacy Settings

Goals
Empower users to feel like (a) data is collected for principled reasons that benefit them, (b) they have a high level understanding of the data collected / how it’s used, and (c) they are satisfied with their level of control. Do so in a way that meets users where they are.

Data Collection
- Reduce perception that Google hoards data
- Reduce likelihood of a security breach of user data
- Reduce ability to join data inappropriately

Transparency
- Increase perception and understanding of user-protective benefits of data
- Articulated in approachable, accessible language in a manner all people can understand
- Transparency offered to users at the moments they need it

Control
- Increase awareness and accessibility of existing data controls
- Increase feelings of control and agency, especially in the moment
- Controls are easily accessible and offered at the right moments of need

Current perception: I have no choice if I want to use the product. Controls are purposely hidden.

User goals:
- Increase awareness and accessibility of existing data controls
- Increase feelings of control and agency, especially in the moment
- Controls are easily accessible and offered at the right moments of need
Key Conclusions

**Conclusion 1:** Search engine defaults generate a sizable and robust bias towards the default.

**Conclusion 2:** Search engine default effects have stronger effects on mobile devices than on personal computers.

**Conclusion 3:** Power of defaults also affects consumers’ privacy decisions in search.