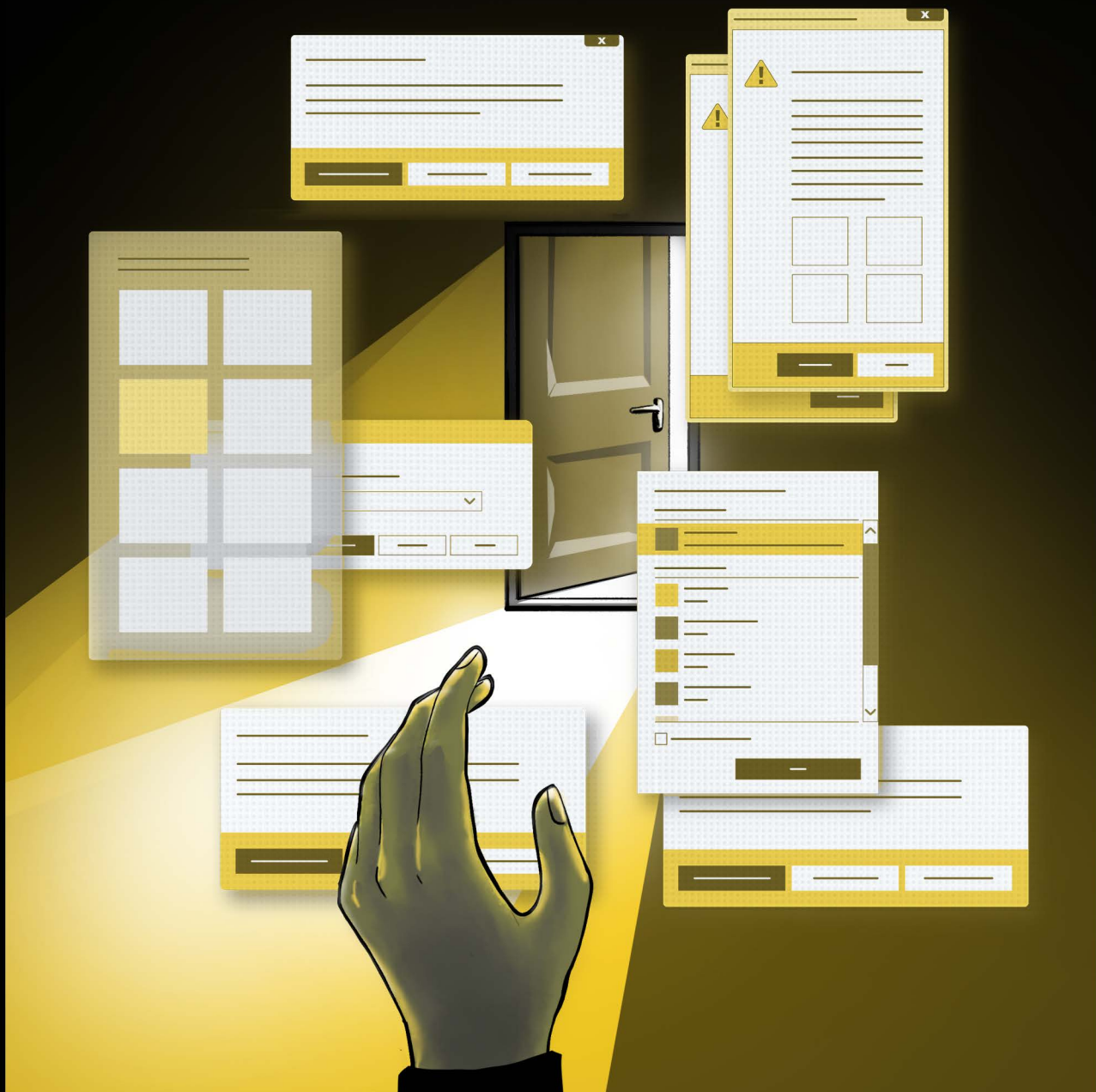


Over The Edge

How Microsoft's Design Tactics
Compromise Free Browser Choice

HARRY BRIGNULL & CENNYDD BOWLES

JANUARY 2024



Over the Edge:
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This report was commissioned by Mozilla to examine how Microsoft Windows and Edge are designed to influence users' choice of web browser; the report's findings, however, are entirely those of the authors. We thank Gemma Petrie, Udbhav Tiwari, and Kush Amlani for their help supporting this research. The design and layout of this report was done by Spitting Image, Bengaluru.

Executive summary

In the world of digital technology, user behaviour has become a battleground. In pursuit of competitive advantage, many tech firms employ various design techniques to encourage users to act in certain ways. Some of these strategies are acceptable, such as persuasive designs that merely provide information and leave the user in full control of their decision. However, some design techniques are problematic or even harmful.

Coercive design restricts users from choosing options that are in their interests, making users worse off. Manipulative design subverts rational choice using covert influence, or exerts undue pressure on the user to do as the manipulator wants. Deceptive design gives users a false understanding, such as a flawed mental model of how a technology works. We can use the label 'harmful design' for any design pattern that falls into these three categories.

In this report, two independent experts investigate Microsoft's design practices across its core operating systems (Windows 10 and 11), web browser (Edge), and search engine (Bing). Examining these patterns first-hand, and referring to a harmful design taxonomy evolved over many years and supported by academic research, **we find Microsoft repeatedly uses harmful design** to influence users into using Edge.

When a user wants to download and install a new browser, Microsoft uses the harmful Preselection, Visual Interference, Trick Wording, and Disguised Ads patterns to skew user choice. When a user tries to set an alternative browser as default, Microsoft uses Obstruction to dissuade the switch and refuses to switch the corresponding default app for various local web-related filetypes. When a user continues to use an alternative browser, Microsoft uses several harmful patterns to push the user back towards Edge, including Visual Interference, Trick Wording, and Preselection.

We conclude that Microsoft's harmful design practices mean users are unable to download, install, use, or set as default an alternative browser without interference. These design choices may lead to:

- consumer harms such as distortion of choice, inducement of nonconsensual data sharing, and emotional distress;
- social harms including erosion of trust in the technology sector; and
- market harms including damage to browser innovation and the skewing of competitive incentives.

We judge that Microsoft cannot justify the use of these techniques, and should stop using them immediately. If they do not, we would welcome – where the law provides for it – regulatory intervention to protect against these harms.

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01.

Introduction: the tensions of digital design

Few industries hold as much power to shape our world as the technology industry. By influencing how we interact with technology, these firms also influence how we can interact with each other today and in the years ahead.

In recent years, researchers^{1,2}, consumer groups^{3,4} and regulators⁵ have examined how commercial software can influence user behaviour, looking in particular from the perspective of psychology and behavioural economics. Seemingly small product changes can contribute to large behavioural effects, in turn leading to swelling profits or gouging losses^{6,7}. Design has become a competitive battleground. Teams design interfaces and features in minute detail, optimising and testing their product so it attracts desirable users and maximises the profit that comes from certain user choices.

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- 1 Dark commercial patterns. (2022). OECD Digital Economy Papers. <https://doi.org/10.1787/44f5e846-en>
 - 2 Directorate-General for Justice and Consumers (European Commission), Lupiáñez-Villanueva, F., Boluda, A., Bogliacino, F., Liva, G., Lechardoy, L., & Rodríguez de las Heras Ballell, T. (2022, May 16). Behavioural study on unfair commercial practices in the digital environment: Dark patterns and manipulative personalisation, final report. Publications Office of the European Union. <https://data.europa.eu/doi/10.2838/859030>
 - 3 BEUC. (2022, July 2). 'Dark patterns' and the EU consumer law acquis: Recommendations for better enforcement and reform. Retrieved 28 March 2023 from https://www.beuc.eu/sites/default/files/publications/beuc-x-2022-013_dark_patterns_paper.pdf
 - 4 Forbrukerrådet [Norwegian Consumer Council]. (2018, June 18). Deceived by design: How tech companies use dark patterns to discourage us from exercising our rights to privacy. Retrieved 8 March 2023 from <https://fil.forbrukerradet.no/wp-content/uploads/2018/06/2018-06-27-deceived-by-design-final.pdf>
 - 5 Federal Trade Commission. (2022, September 15). Bringing Dark Patterns to Light - FTC staff report. Retrieved 1 January 2023 from <https://www.ftc.gov/reports/bringing-dark-patterns-light>
 - 6 Spool, J. (2009, January 14). The \$300 Million Button. Retrieved December 4, 2023, from https://articles.centercentre.com/three_hund_million_button/
 - 7 Carr, A. (2010, September 23). Digg Redesigns, Loses More Than A Quarter of Audience. Retrieved December 4, 2023, from <https://www.fastcompany.com/1690829/digg-redesigns-loses-more-quarter-audience>

Of the many ways to influence user behaviour, some are an acceptable and expected part of a competitive market. However, the pursuit of business goals has sometimes tempted technology companies to deploy designs that use unjustifiable techniques. For example, a design may push users towards profitable actions by Nagging⁸ them until they eventually give in, or it may Preselect⁹ choices so as to make them hard to notice, meaning users may find their defaults changed without their knowledge. Other designs steer users away from unprofitable actions using Obstruction¹⁰, hiding features behind multiple, tiresome steps. Some designs even employ Forced Action¹¹, such as compelling people to use a particular browser if they wish to use that operating system and device.

Brignull¹² was one of the first researchers to identify problematic designs, describing them as 'dark patterns'. Many researchers, regulators, and policy specialists have since audited and categorised similar designs¹³, using alternative terms such as 'harmful online choice architecture'¹⁴. Recently, the terms 'deceptive patterns' and 'harmful design' have emerged as catch-all labels¹⁵.

Whatever the name, these patterns can cause direct harm to consumers and the health of the market. Some regulators have therefore begun to impose restrictions on these techniques¹⁶. Nevertheless, harmful design techniques are still commonplace in digital product design and development. In this report, we investigate whether certain design practices in the browser market might harm individual users, society, and the market.

8 Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Nagging. Retrieved October 20, 2023, from <https://www.deceptive.design/types/nagging>

9 Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Preselection. Retrieved October 20, 2023, from <https://www.deceptive.design/types/preselection>

10 Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Obstruction. Retrieved October 20, 2023, from <https://www.deceptive.design/types/obstruction>

11 Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Forced Action. Retrieved October 20, 2023, from <https://www.deceptive.design/types/forced-action>

12 Brignull, H. (2010, October 3). Dark patterns. Retrieved October 27, 2023 from <https://old.deceptive.design/> A historical snapshot of darkpatterns.org, which was recently renamed to deceptive.design

13 Federal Trade Commission. (2022, September 15). FTC Report Shows Rise in Sophisticated Dark Patterns Designed to Trick and Trap Consumers | Federal Trade Commission. Retrieved October 22, 2023, from <https://www.ftc.gov/news-events/news/press-releases/2022/09/ftc-report-shows-rise-sophisticated-dark-patterns-designed-trick-trap-consumers>

14 Competition and Markets Authority. (2022, September 2). Online Choice Architecture: How digital design can harm competition and consumers 2022 (CMA). GOV.UK. Retrieved 2 January 2023 from <https://www.gov.uk/find-digital-market-research/online-choice-architecture-how-digital-design-can-harm-competition-and-consumers-2022-cma>.

15 Under advice from the Tech Policy Design Lab of the World Wide Web Foundation, the authors of this report do not use the term 'dark pattern' due to its potentially damaging racial connotations. In this report, the term 'dark pattern' is used only when referring to laws, quotations and research papers that use the specific term.

16 OECD. (2022). "Annex F: EU legislation that may address selected dark patterns" in "Dark commercial patterns." 68-71. <https://doi.org/10.1787/44f5e846-en>

02.

Terminology

To understand what makes design practices harmful or acceptable, we should first define some key concepts.

Persuasion

Persuasion involves trying to get someone to do or believe something by appealing to rational judgement. A persuader has a point of view and explains it transparently, but the subject can still consider their options and decide whether to be persuaded. Since all options are left on the table and the subject can choose freely, we usually see persuasion as a perfectly acceptable part of everyday life.

Arguably, all design is persuasive. By Herb Simon's definition¹⁷, a designer 'devises courses of action aimed at changing existing situations into preferred ones.' Virtually any attempt to do this will involve persuading others to follow your recommended course.

Coercion

We often think of coercion as eliminating a subject's choices and forcing them down a particular path of action. But experts today tend to take a broader view, arguing coercion doesn't require force: threatening someone for the same ends also qualifies¹⁸. The point is that the so-called 'baseline' changes: whether a coercer uses a threat or direct force, the subject ends up worse off. 'Your money or your life', for example, is a coercive choice between two distinctly unappealing options.

17 Simon, H. A. (1969). *The sciences of the artificial*. M.I.T. Press

18 Nozick, R. (1969). "Coercion," in *Philosophy, Science, and Method: Essays in Honor of Ernest Nagel*, Sidney Morgenbesser, Patrick Suppes, and Morton White (eds.), New York: St. Martin's Press, 440–472

It might seem that design is coercive by nature since, as Tristan Harris has written, 'If you control the menu, you control the choices.'¹⁹ But while it's true a user can only do what an interface lets her do, there's a difference between merely offering certain choices and outright coercion. We will only call a design coercive where it restricts or dissuades users from choosing options that are in their interests, doing so in a way that makes users worse off, lowering their baseline of well-being.

Manipulation

We can see manipulation as anything that falls between the extremes of rational persuasion and full coercion. Manipulation, unlike coercion, 'does not interfere with a person's options. Instead, it perverts the way that person reaches decisions, forms preferences, or adopts goals.'²⁰

Two further nuances make manipulation particularly relevant to design. By one definition, when we manipulate someone we try to bypass their reasoning. One way to manipulate people, then, is to use psychological techniques that influence them covertly.²¹

Users are frequently unaware of how design tactics can steer their behaviour. They may also be unaware of their own cognitive biases, i.e. weaknesses that impair their rationality. And since company goals are usually commercially secret, users typically don't know for sure what behaviours the company is trying to induce. So while a graphical user interface itself isn't covert, its intent and methods of influence often are. By this definition, therefore, design can easily be manipulative. Indeed, many design books and articles cheerfully describe how to encourage certain behaviours by exploiting users' cognitive biases and bypassing their reasoning^{22,23}.

A second definition of manipulation is to see it as pressure to do as the manipulator wants²⁴. A manipulator might, for example, impose additional costs on someone who doesn't comply with the desired behaviour. This too is common in digital products, where some companies

19 Harris, T. (2016, May 16). How Technology is Hijacking Your Mind – from a Magician and Google Design Ethicist. Retrieved December 4, 2023 from <https://medium.com/thrive-global/how-technology-hijacks-peoples-minds-from-a-magician-and-google-s-design-ethicist-56d62ef5edf3>

20 Raz, J. (1988). *The Morality of Freedom*, Oxford, New York: Oxford University Press

21 Ware, A. (1981). The Concept of Manipulation: Its Relation to Democracy and Power, *British Journal of Political Science*, 11(2): 163–181

22 Eyal, N., & Hoover, R. (2014). *Hooked: How to build habit-forming products*. Portfolio.

23 250 best A/B testing ideas based on neuromarketing. (n.d.). *Convertize.com*. Retrieved January 31, 2023 from <https://tactics.convertize.com/principles>

24 Noggle, R. (2022) The Ethics of Manipulation, *The Stanford Encyclopedia of Philosophy*, Edward N. Zalta (ed.). Retrieved December 4, 2023 from <https://plato.stanford.edu/archives/sum2022/entries/ethics-manipulation>

ostensibly respect users' wishes but still impose costs for noncompliance – usually time costs such as extra clicks, or cognitive costs that arise when users have to figure out how to choose their preferred option. As this pressure accumulates, the costs of noncompliance may build to the point where the user gives up their resistance. A series of microaggressive interactions can wear a user down and finally induce the desired behaviour.

Deception

In common speech, to deceive is to cause someone to believe what is false. So we might say that deceptive design is one that gives a user an understanding – such as a mental model of how a system works – that is false^{25,26}. An example would be an alert claiming a sale price is only available for the next hour (a scarcity prompt that makes the user fear they'll miss out) while the purported sale price is actually the item's permanent price.

Defining harmful design

Design that merely persuades is surely acceptable and fair. Since users are free to make their own decisions and all important options are left on the table, it's hard to argue anyone is harmed or meaningfully wronged. However, design that manipulates, coerces, or deceives is far more questionable. In day-to-day use, people tend to see all three as morally wrong, and most philosophers – while at times being pickier – nevertheless agree manipulation, coercion, and deception are wrong on principle.

By the definition above, not all 'deceptive patterns' employ deception. For this report we elect to use the umbrella term **harmful design** for design interventions that wrongfully use coercion, manipulation, or deception. This too is an imperfect label. For example, some actions can be wrong even if they don't cause direct harm. While we analyse potential harms in Chapter 06, our research has focused only on the observable interface and design patterns, meaning this extrapolation of harms is in part speculative.

To help us identify these practices we reference a predefined taxonomy (see Appendix). This taxonomy builds on Brignull's original work²⁷ to include revisions identified by Mathur et

25 Philosophers are divided on whether deception can happen without intent. For the purposes of this report we will treat accidental misinformation as a case of deception.

26 The FTC lists 'false beliefs' as one of the top consumer protection concerns posed by 'dark patterns', see Federal Trade Commission. (2022, September 15). Bringing dark patterns to light - FTC staff report. Retrieved January 1, 2023 from <https://www.ftc.gov/reports/bringing-dark-patterns-light>

27 Brignull, H. (2010) Dark Patterns: User Interfaces Designed to Trick People. Retrieved December 4, 2023 from <https://old.deceptive.design>

al.²⁸ and Gray et al²⁹. The Mathur classification arose from analysis of 11,000 websites that revealed 1,818 instances of problematic design patterns, making it one of the most comprehensive audits performed to date. Every pattern our taxonomy identifies involves manipulation, deception, or coercion to some degree.

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- 28 Mathur, A., Acar, G., Friedman, M., Lucherini, E., Mayer, J., Chetty, M., & Narayanan, A. (2019). Dark Patterns at Scale: Findings from a Crawl of 11K Shopping Websites. *Proceedings of the ACM on Human-Computer Interaction*, 3(CSCW), 1-32
- 29 Gray, C., Kou, Y., Battles, B., Hoggatt, J., and Toombs, A. L. (2018). The Dark (Patterns) Side of UX Design. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. Association for Computing Machinery, New York, NY, USA, Paper 534, 1-14

03.

Research context

When the World Wide Web was first invented, there was just one browser, created by a scientist and released into the public domain³⁰. The advent of commercial web browsers introduced the imperative to balance user needs with corporate objectives. This competition contributed directly to the ‘browser wars’ of the 90s and 2000s³¹. In truth, the browser wars never went away. Acquiring and retaining users is a top priority for browser vendors, and competition remains strong.

This research report investigates the design practices of an OS and browser vendor: Microsoft. It’s natural for an OS provider to prefer their users to adopt the company’s own browser, and we believe persuasive techniques that don’t interfere with a user’s rational choice are justified. But we propose that, to be fair to users and to avoid causing potential harm, an OS manufacturer must also let their users:

- download and install any legitimate alternative browser³²;
- set this browser as default; and
- use this browser on an ongoing basis,

without employing coercion, manipulation, or deception.

30 W3C. (n.d.). Tim Berners-Lee: WorldWideWeb, the first Web client. Retrieved October 22, 2023, from <https://www.w3.org/People/Berners-Lee/WorldWideWeb.html>

31 Ivan, S. (2023, January 16). How the “Browser Wars” Changed the Landscape of the Internet | HackerNoon. Retrieved October 22, 2023, from <https://hackernoon.com/how-the-browser-wars-changed-the-landscape-of-the-internet>

32 It is entirely acceptable – indeed, important – for OS manufacturers to prevent users installing unsafe software.

Research background

This research was sponsored by Mozilla, who selected Microsoft as the subject. Microsoft remains the globally dominant desktop OS manufacturer: as seen in Figure 1³³, from 2022–23, Windows enjoyed a market share of 71.5%³⁴.

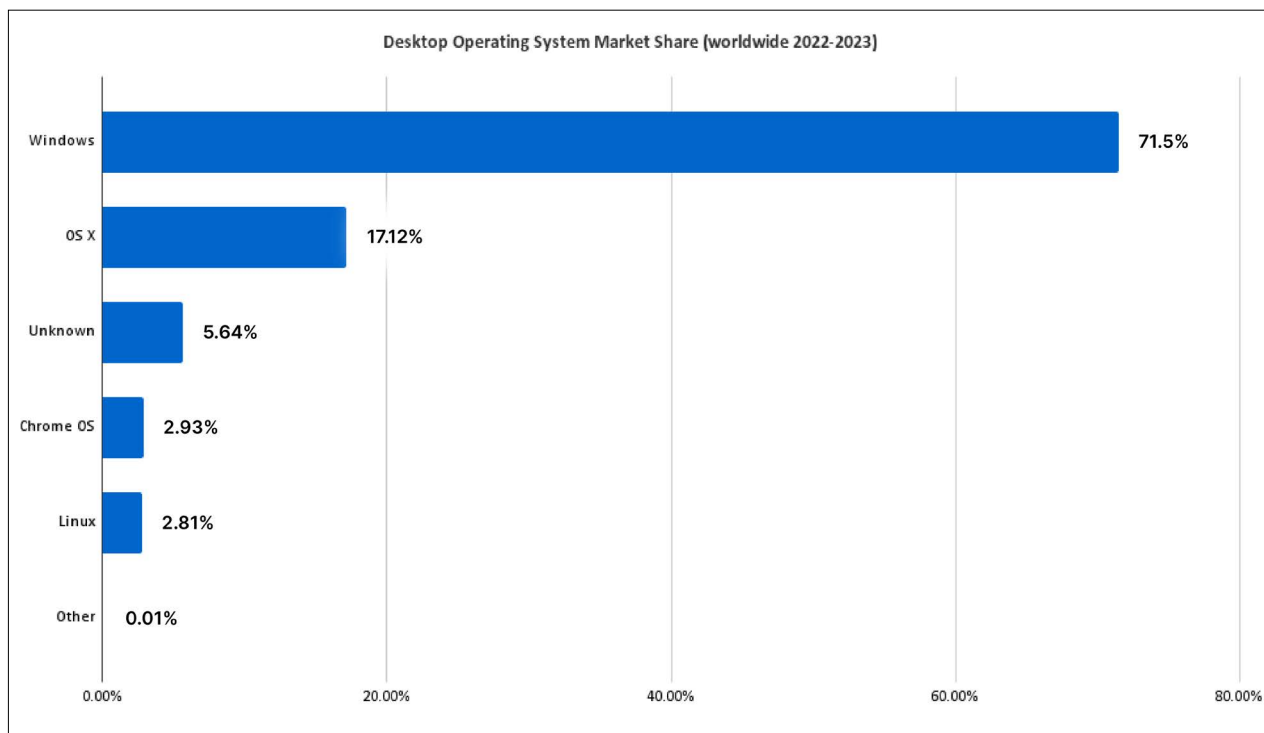


Figure 1: Global desktop OS market share, 2022–2023.

Statcounter also reports that in 2022-2023³⁵ Windows 10 was the most commonly used version of Windows (71.98%), followed by Windows 11 (17.42%). Since these also feature the modern version of Edge, featuring Chromium source code, our report focuses on these two OS versions.

33 Statcounter uses a JavaScript tracker that is blocked by some browsers and browser extensions. Browsers that have inbuilt tracker blocking features are likely to be under reported by statcounter. It is used here because it is one of the only publicly available sources that offers multiple years of browser market share data.

34 Desktop Browser Market Share Worldwide | Statcounter Global Stats. (n.d.). Retrieved October 24, 2023, from Statcounter website: <https://gs.statcounter.com/browser-market-share/desktop/worldwide/#monthly-200901-202310>

35 Desktop Windows Version Market Share Worldwide Jan 2009 - Oct 2023 | Statcounter Global Stats. (n.d.). Retrieved October 24, 2023, from Statcounter website: <https://gs.statcounter.com/windows-version-market-share/desktop/worldwide/#yearly-2022-2023-bar>

Examining browser market share from January 2020 to the present (October 2023) allows us to see Edge Chromium’s³⁶ market entry and subsequent growth (the blue line in Figure 2)³⁷ to 10.8% share today.

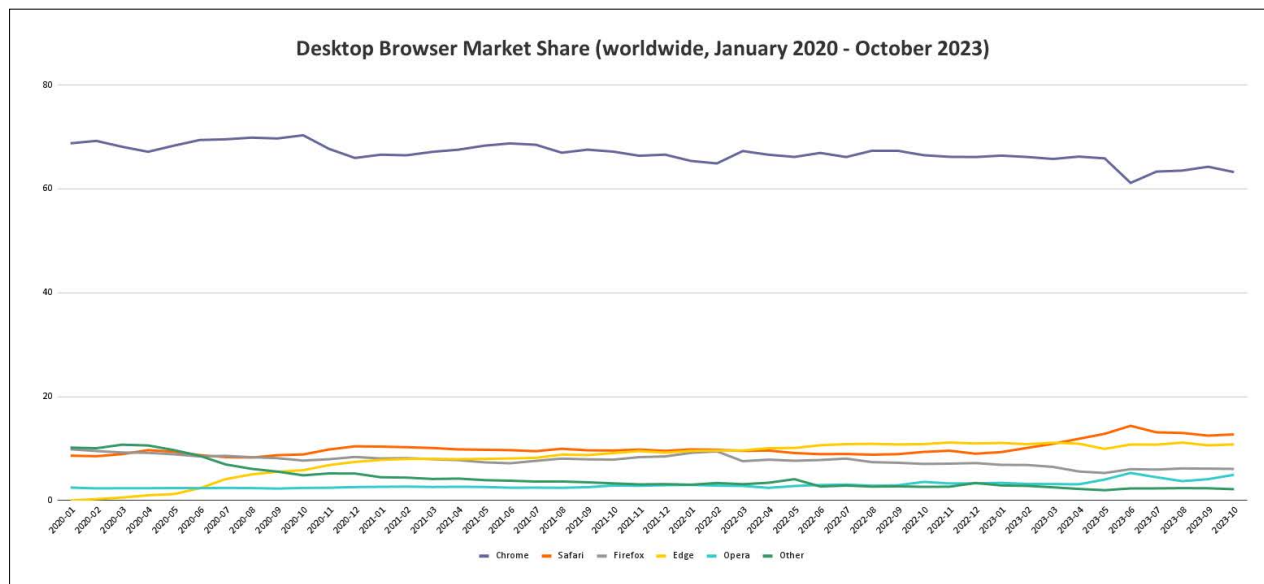


Figure 2: Global desktop OS market share, Jan 2020 – Oct 2023.

Through this period, other browser manufacturers have accused Microsoft of using harmful design practices to increase market share. Vivaldi CEO Jon von Tetzchner’s open letter³⁸ ‘express[es] concerns over Microsoft’s recent behaviour’, while a recent Mozilla research paper³⁹ argues:

‘People should not have to fight with operating systems that continuously pester, confuse and revert preferences in favor of their own software. Yet that is what happens today. The power that operating system providers wield and the actions they take through the designs of their user interfaces [...] can prevent consumers from making free decisions about which services they wish to use.’

In this report, we analyse major browser choice journeys in Windows 10 and 11 and offer expert opinion on whether the design practices involved might lead to consumer harms.

36 Hereafter called ‘Edge’ for brevity.

37 Statcounter is an imperfect tool for measuring browser market share, but in the absence of alternatives for the relevant time period, we have relied on this source. Desktop Windows Version Market Share Worldwide Jan 2020 - Oct 2023 | Statcounter Global Stats. (n.d.). Retrieved October 24, 2023, from Statcounter website: <https://gs.statcounter.com/browser-market-share/desktop/worldwide/#monthly-202001-202310>

38 Tetzchner, J. von. (2023, September 19). Vivaldi’s Open Letter — Microsoft DMA Compliance | Vivaldi Browser. Retrieved October 24, 2023, from <https://vivaldi.com/blog/vivaldis-open-letter-microsoft-dma-compliance/>

39 Mozilla. (2022). Five Walled Gardens: Why Browsers are Essential to the Internet and How Operating Systems Are Holding Them Back. Retrieved from https://research.mozilla.org/files/2022/09/Mozilla_Five-Walled-Gardens.pdf

Research ethics and integrity

We must here address the potential for conflict of interest. As browser makers themselves, the report's sponsors Mozilla have a commercial interest in understanding – and potentially opposing – the design practices of OS manufacturers.

We stress, therefore, that the authors are acting as entirely independent researchers. The findings that follow are ours alone, free of sponsor influence. In our research we spoke with many stakeholders, including other browser manufacturers. Again, our findings are independent of their influence, and we took pains not to discuss any non-public or commercially sensitive information with any stakeholders.

We make no claim that Microsoft might be alone in their potential use of harmful design patterns. Other researchers have found many tech companies using similar techniques in their products and services⁴⁰. In addition, the authors have carefully considered potentially valid reasons for each pattern to be employed. We are therefore confident our findings are fair, accurate to the best of our knowledge, and based on observable, objective evidence.

40 OECD. (2022). "Annex C: Selected evidence of the prevalence of dark patterns" in "Dark commercial patterns." 54–59. <https://doi.org/10.1787/44f5e846-en>

04.

Research method

In this research study, conducted in October 2023, we carried out an online content review, subject matter expert interviews, and expert evaluation focusing on browser design choices and interventions in Windows and Edge.

Research questions

Our research questions ask whether Windows and Edge uphold our proposed principles of fair design.

- Q1. Downloading · Do Windows and Edge allow users to download and install a different browser without harmful interference?
- Q2. Setting · Do Windows and Edge allow users to set a different browser as their default without harmful interference?
- Q3: Respecting · Do Windows and Edge respect users' choice of default browser and allow them to continue using it without harmful interference?

Content review

Initially, we conducted a review of news articles, regulatory reports, social media, and forums to find content that commented on the use of potentially problematic or harmful design patterns in Windows 10, Windows 11, and the various versions of Edge since 2020. References were aggregated in a database, and duplicates and questionable sources were removed.

Subject matter expert interviews

We carried out interviews with stakeholders at Mozilla, Google and Vivaldi. The purpose of these interviews was to help us understand the technical characteristics and terminology of the issues we were investigating, and to furnish us with links to relevant articles and papers for our online content review. The interviews were purely focussed on information already publicly available on the web, directing us to resources that we could then evaluate independently.

Reproduction of issues

Wherever possible, we reproduced the issues discovered in content review on our own computers, to verify the claims and ensure we accurately understood the design interventions used. We used Virtualbox on macOS with Windows 10 Home and Parallels Desktop 19 on macOS with Windows 11 Pro. For the investigation of ‘Copilot in Windows Preview’ we used Windows 11 Home Insider Preview Version.

Specific versions and build numbers are provided as footnotes for each example. Bear in mind that our observations are not exhaustive. An observation reported for a certain date, version and application build number may be reproducible on other dates, versions or build numbers, but it may not.

We could not reproduce every issue our content review identified. User experiences within Windows, Edge, and other Microsoft products can change from one day to the next. There may also be differences or future differences in the products between jurisdictions.⁴¹ During our evaluation, the IP addresses we used for our internet connection were in the UK; we did not use a VPN to attempt to change our apparent location⁴². Cross-territorial analysis is beyond the scope of this report.

Like many other modern software products, the OS and apps appear to incorporate some behaviours that are triggered remotely by the vendor. Technology companies also frequently A/B test different experiences with different user groups, or run small-scale deployments to evaluate how a new design or feature performs. This can make it hard to track which design patterns are employed at any given time, meaning it isn’t always possible to repro-

41 Langowsky, A., LeBlanc, B. (2023, August 25). Announcing Windows 11 Insider Preview Build 23531 (Dev Channel). Retrieved December 4, 2023 from <https://blogs.windows.com/windows-insider/2023/08/25/announcing-windows-11-insider-preview-build-23531-dev-channel/>

42 This is notable because it is common for tech companies to use geolocation targeting to provide different user experiences in different regulatory jurisdictions.

duce specific observations. Regulators face these same challenges when analysing software behaviours. We have reported the date and exact software versions and build numbers for direct observations, but our findings also include, as a last resort, some screenshots and examples from third-party sources. These exceptions are labelled.

Expert evaluation

Our evaluation method involved gathering screenshots for a given interaction scenario or 'user journey'. We then analysed these journeys and the related design choices within them, noting any patterns identified in our harmful design taxonomy, and judging whether they strayed into the realms of manipulation, coercion or deception.

05.

Findings

In this section we describe Edge's role as a core Windows component, then address Microsoft's design decisions that impact 1. downloading a new browser, 2. setting it as a default, and 3. having that default respected in ongoing use.

Edge as core component of Windows

On a fresh install of Windows 10 or 11, Edge comes pre-installed. It is also the default browser. The app is also pinned to the taskbar, making it prominently visible from day one. It is undoubtedly important to give the user a browser in a fresh OS install, but clearly this setup is favourable to Edge and Microsoft.

Users who want to uninstall Edge will soon discover that they can't. Microsoft argues that 'Because Windows supports applications that rely on the web platform, our default web browser is an essential component of our operating system and can't be uninstalled'⁴³.

There is no immediately obvious technical reason for Windows to be built this way, although it is an increasingly common practice on other OSs⁴⁴. Open source OSs such as Linux do not require a specific web browser to function. In November 2023, Microsoft signalled that it would change this practice, permitting Edge to be uninstalled in the European Economic Area only, to comply with the Digital Markets Act.⁴⁵

43 Why can't I uninstall Microsoft Edge? - Microsoft Support. (n.d.). Retrieved October 23, 2023, from Microsoft Support website: <https://support.microsoft.com/en-us/microsoft-edge/why-can-t-i-uninstall-microsoft-edge-ee150b3b-7d7a-9984-6d83-eb36683d526d>

44 Mac Mojave, how to remove Safari - Ask Different. (2019). Retrieved October 27, 2023, from Stack Exchange website: <https://apple.stackexchange.com/questions/356611/mac-mojave-how-to-remove-safari>

45 Previewing changes in Windows to comply with the Digital Markets Act in the European Economic Area (2023, November 16). Retrieved December 28, 2023, from Microsoft Windows Insider Blog: <https://blogs.windows.com/windows-insider/2023/11/16/previewing-changes-in-windows-to-comply-with-the-digital-markets-act-in-the-european-economic-area/>

Edge being pre-installed and unremovable on Windows gives Microsoft an advantage in driving Edge adoption. When Microsoft wants to convince users to try Edge or switch to it permanently, just a single click or configuration change can do the job. Since Edge is pre-installed, the user need not go through the process of downloading and installing it from scratch, a process involving several decision-points that might allow the OS provider to influence user choice and cause the user to reconsider.

Q1: Do Windows and Edge allow users to download and install a different browser without harmful interference?

The subsections below describe various user journeys an individual may experience when trying to download a new browser.

Using Edge for the first time

When a user wants to download a new browser on a fresh Windows 10 or 11 installation, their only realistic option is to open Microsoft Edge⁴⁶. Edge will then run through a series of steps called the First Run Experience. This acts as a ‘funnel’: a series of steps that invite the user to import their data from the browser they previously used and to configure the browser to their preferences.

This is a standard practice with most browsers. However, since Edge is the only preinstalled browser, virtually every Windows user⁴⁷ must experience the Edge First Run Experience before they can use the web or download an alternate browser. While other browser vendors on Windows can typically be sure that users are running their browser through choice, Edge cannot. Some users stepping through the Edge First Run Experience do not want to use Edge, and are only doing so because they have no choice.

46 Although unlikely, an expert user determined to avoid using Edge could technically download an alternative browser using command line utilities or external media. Given the disparity of effort to reward, we are ignoring this scenario.

47 The Edge First Run Experience can be disabled by manually editing the registry. Since only highly expert users are capable of doing this, we will not consider this within this report. Windows machines managed in a workplace may also have the First Run Experience turned off via a ‘group policy’ by the relevant administrator. This is also outside the scope of this report, since we focus on individual users who lack professional IT support.

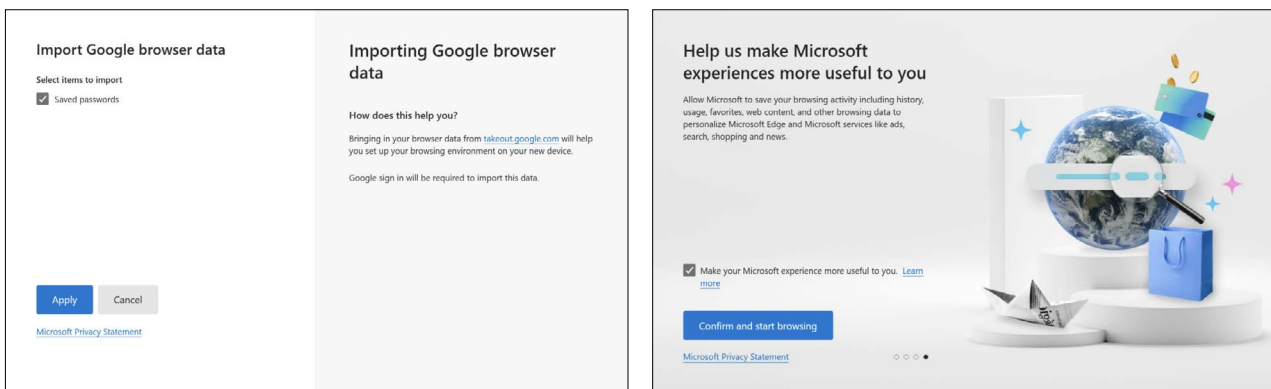
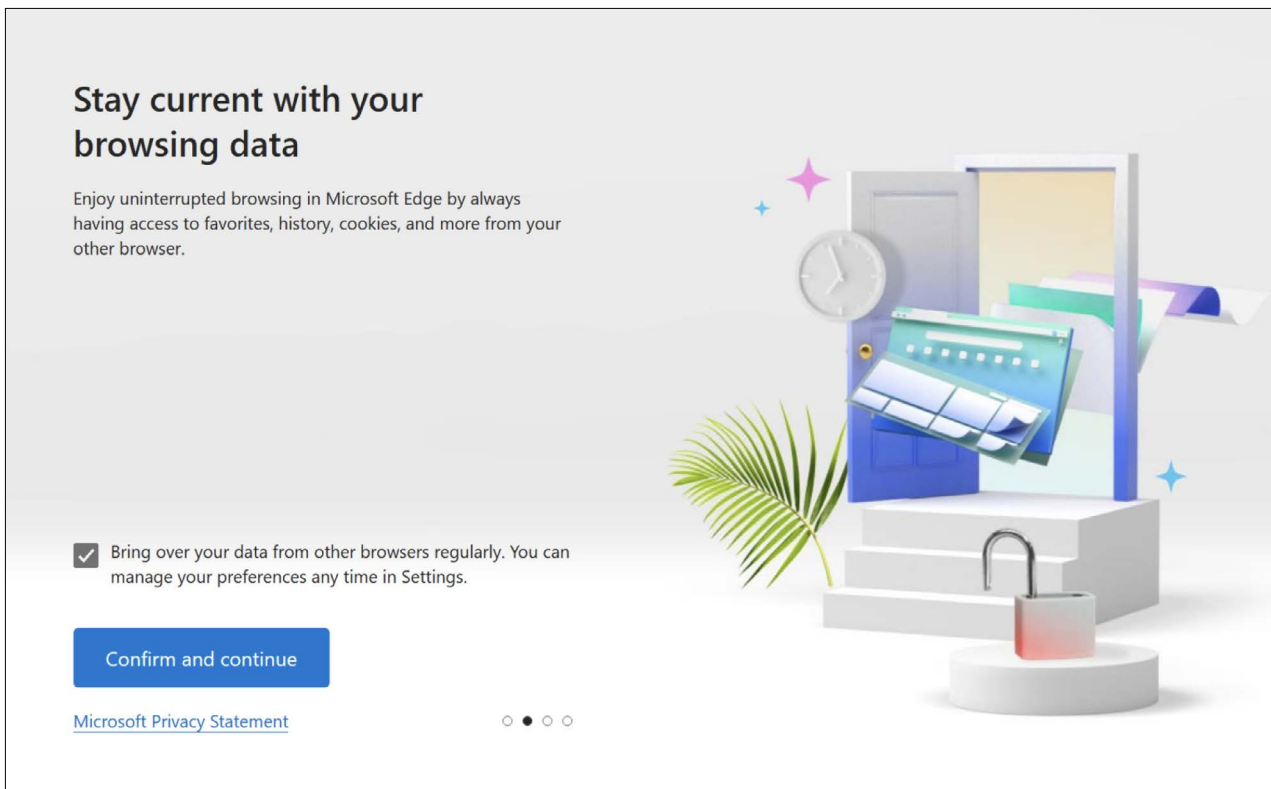


Figure 3: Three pages from the Microsoft Edge Version 117 First Run Experience that uses grey, preselected checkboxes to influence users' decisions.

The top frame in figure 3 shows the second step of the Edge First Run Experience⁴⁸. If the user does not carefully evaluate all of the text and user interface components on this page they are likely to press the large blue 'Confirm and continue' button without noticing the preselected checkbox 'Bring over your data from other browsers regularly. You can manage your preferences at any time in Settings'.

48 All references to the the First Run Experience in this section are based on observations of Microsoft Edge Version 117.0.2045.60 (Official build) (arm64), as captured on 18th October 2023

This is an example of the **Preselection** pattern⁴⁹, which exploits the default effect cognitive bias, a psychological phenomenon in which people tend to go with the option already chosen for them, even if other choices are available. The use of Preselection undermines the validity of consent. It is implausible that every user will note this checkbox and understand its meaning, and we do not believe leaving the box checked should be taken as a signal of active consent. Many users will doubtless find themselves surprised by what they have apparently 'agreed' to.

The colour of this checkbox – grey – is also important. This does not follow Microsoft's own design guidelines and templates⁵⁰, which specify that a ticked checkbox should be an eye-catching blue colour. According to Microsoft's design documentation⁵¹ grey should only be used when a checkbox is disabled, communicating to the user that nothing will happen if they click the checkbox. Placed as it is on a white background, this grey is low contrast and easy to overlook. As such, this is also an example of the **Visual interference** pattern⁵², a type of misdirection that involves visually obscuring important information a user might reasonably expect to see.

We believe this combination of the Preselection and Visual Interference patterns may cause users to not notice this checkbox. The user may then not understand that if they follow the guidance in the subsequent steps, this will allow Microsoft to continuously import data (much of which will be personal data) from their Google account.

The lower frames in Figure 3 show two further steps of the Edge First Run Experience. Bottom-left, if a user does not notice the preselected, greyed-out 'Saved passwords' checkbox, they may find their confidential passwords have been imported to Edge without their knowledge. The bottom-right screen uses a similar pattern: if a user overlooks the preselected, greyed-out 'Make your Microsoft experience more useful to you' checkbox, Microsoft will start tracking the user's behaviour in Edge and using that data for commercial purposes. This screen uses the **Trick Wording**⁵³ pattern, since the checkbox label does not convey the fact that this checkbox is really about tracking, data collection and advertising – nor that the user must take an action if they wish to decline.

49 Brignull, H., Leiser, M., Santos, C. & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Preselection. <https://www.deceptive.design/types/preselection>.

50 Fluent Windows UI 3 Figma documentation: [https://www.figma.com/file/SXOI2zSYCGwHHDmj6e7UwL/Windows-UI-3-\(Community\)?type=design&node-id=25616%3A1593&mode=design&t=jal6dkFu0WjE1kkx-1](https://www.figma.com/file/SXOI2zSYCGwHHDmj6e7UwL/Windows-UI-3-(Community)?type=design&node-id=25616%3A1593&mode=design&t=jal6dkFu0WjE1kkx-1)

51 Microsoft. (2022, June 10). Checkbox component - Fluent Windows UI 3 Figma documentation. Retrieved from [https://www.figma.com/file/SXOI2zSYCGwHHDmj6e7UwL/Windows-UI-3-\(Community\)?type=design&node-id=25616%3A1593&mode=design&t=jal6dkFu0WjE1kkx-1](https://www.figma.com/file/SXOI2zSYCGwHHDmj6e7UwL/Windows-UI-3-(Community)?type=design&node-id=25616%3A1593&mode=design&t=jal6dkFu0WjE1kkx-1)

52 Brignull, H., Leiser, M., Santos, C. & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Visual Interference. <https://www.deceptive.design/types/visual-interference>

53 Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Trick Wording. Retrieved October 20, 2023, from <https://www.deceptive.design/types/trick-wording>

Downloading an alternative browser using Windows

After installing Windows, users will naturally wish to install their preferred applications, possibly including an alternative browser to replace Edge. One reasonable way to start this activity is the prominently positioned Windows Taskbar Search. If a user searches for a number of alternative browsers in this Taskbar Search, they will see a promoted message from Microsoft: 'Switch to the browser recommended by Microsoft. / Get speed, security and privacy with Microsoft Edge / Try now' (Figure 4)⁵⁴.

54 Screenshots captured on 27th October 2023 on Windows 11 Pro, Version 22H2, Build 22621.1702, Windows Feature Experience Pack 1000.22641.1000.0

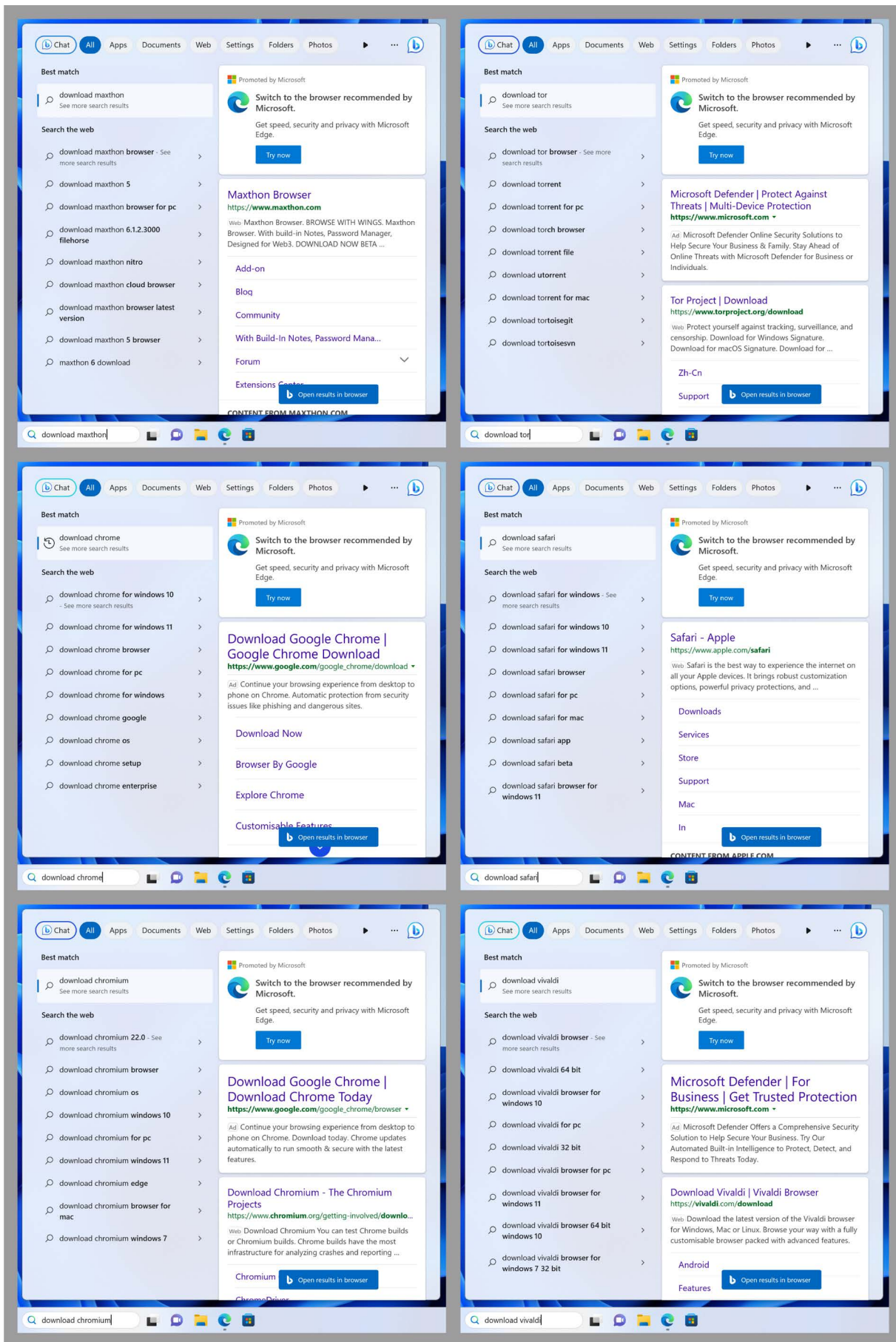


Figure 4: In the Windows 11 taskbar, when a user searches for various browsers using taskbar search, Microsoft shows a promoted message that attempts to dissuade them from proceeding.

As shown in Figure 4, the Microsoft-promoted message currently appears when the user enters search terms that relate to the Maxthon, Tor, Chrome, Safari, Chromium, and Vivaldi browsers. It does not appear for other popular browsers such as Firefox, Opera, or Brave.

Clearly the intention of this promoted message is to dissuade users from downloading an alternative browser. It does so using the **Visual Interference** pattern: the promoted panel's higher visual priority directs attention away from the desired search results, steering the user away from alternative browsers. The behaviour of the Taskbar Search arguably shows Microsoft using its privileged position as the owner of Windows and Bing (both of which power the component) to interfere with a user's decision-making.

If the user ignores the promoted message in the taskbar and clicks either 'See more search results' or 'Open results in browser', this causes the Edge browser to be opened (Figure 5)⁵⁵.

55 Screenshots captured on October 27, 2023 on Windows 11 Pro, Version 22H2, Build 22621.1702, Windows Feature Experience Pack 1000.22641.1000.0 using Microsoft Edge Version 118.0.2088.69. We observed a similar user experience on October 18, 2023 on Windows 10, Version 10.0.19044 Build 19044 using Microsoft Edge Version 118.0.2088.46 (Official build) (64 bit)

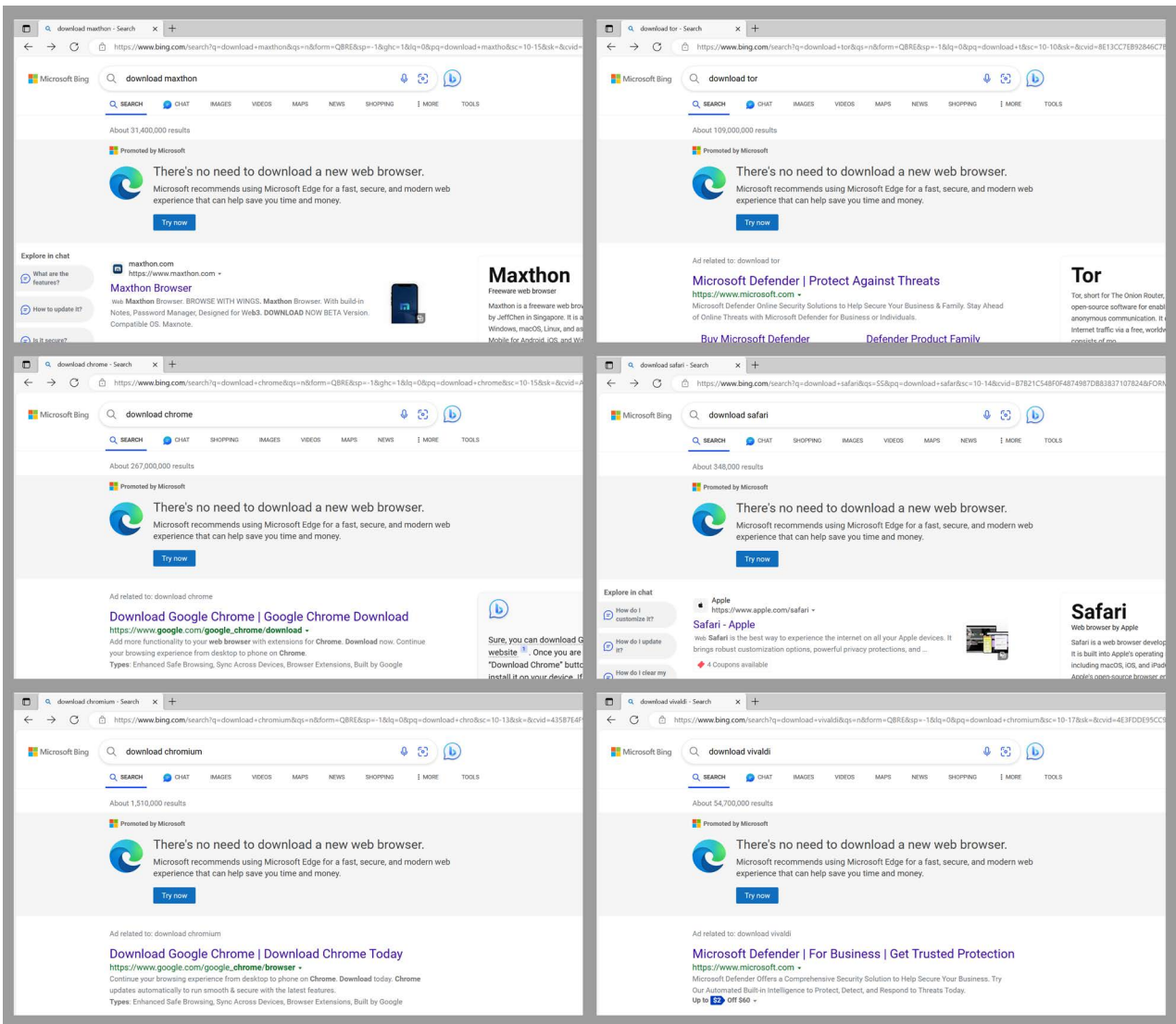


Figure 5: In Edge 118 on Windows 11, when a user searches for various chat browsers, Microsoft shows a promoted message that attempts to dissuade them from proceeding.

Here, Bing has detected that the user is using Edge and has entered a search query suggesting they want to download a competitor browser. Bing adds a large promotional message atop the search results that follow, attempting to discourage the user from this task (Figure 6). Clicking the 'Try now' button opens a new tab and takes the user to a promotional page about Edge on microsoft.com.

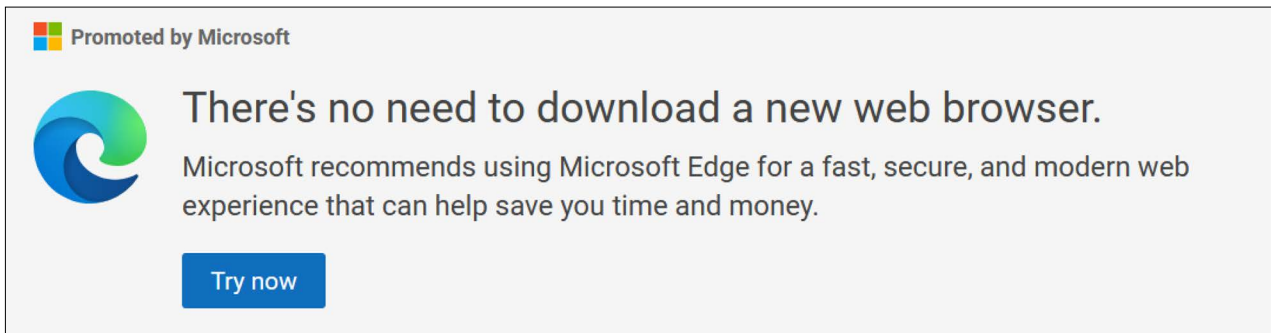


Figure 6: message Bing displays when an Edge user enters a search query to download an alternative browser, such as Vivaldi.

We were able to reproduce this behaviour on any web browser that provided the Microsoft Edge user agent to Bing⁵⁶. For example, using Safari on macOS and switching the user agent to 'Microsoft Edge – macOS' or 'Microsoft Edge – Windows' and carrying out the searches shown in Figure 5 led to the same results. This indicates that this intervention was carried out by Bing, unrelated to any particular Windows or Edge versions or builds.

A user will likely recognise the message is promoted by Microsoft, their OS and search engine provider, since it is labelled as such. However, the message appears in a non-standard format that we have never observed in any other Bing ad. Instead, it is presented in a similar style to the Windows user interface, which the user may further interpret as a marker of authority and legitimacy. It is also targeted at precisely the moment a person searches for a rival browser.

Operating systems have custodial roles regarding system operations and security. If a user's OS tells them to do something, the user is likely to comply so that their computer won't 'break', get a virus, or become vulnerable to a hack. The use of 'secure' in the text of the banner, therefore, may influence users to go along with Microsoft's recommendation without further thought. With this message Microsoft is taking advantage of the trust gained by their custodial role as OS provider and using it to misdirect users, implying that compliance is necessary for security reasons.

A user may reasonably conclude therefore, that this message is some sort of system notification or system warning. As well as employing **Visual Interference**, this is therefore a **Disguised Ad**⁵⁷.

56 As tested on October 27, 2023

57 Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Disguised ads. Retrieved December 4, 2023, from <https://www.deceptive.design/types/disguised-ads>

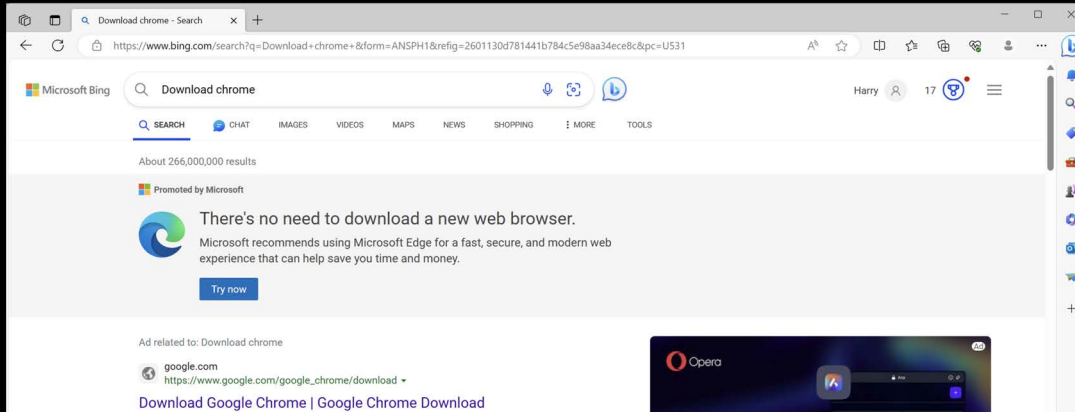
Microsoft could dispel any false conclusions the user comes to by clarifying that, for example:

- the message is not a custodial warning or notification from their OS or its antivirus software;
- the user has a free choice of browsers, and alternatives may be equally fast, secure, and modern;
- Microsoft is not officially rejecting the browser the user is seeking for security reasons.

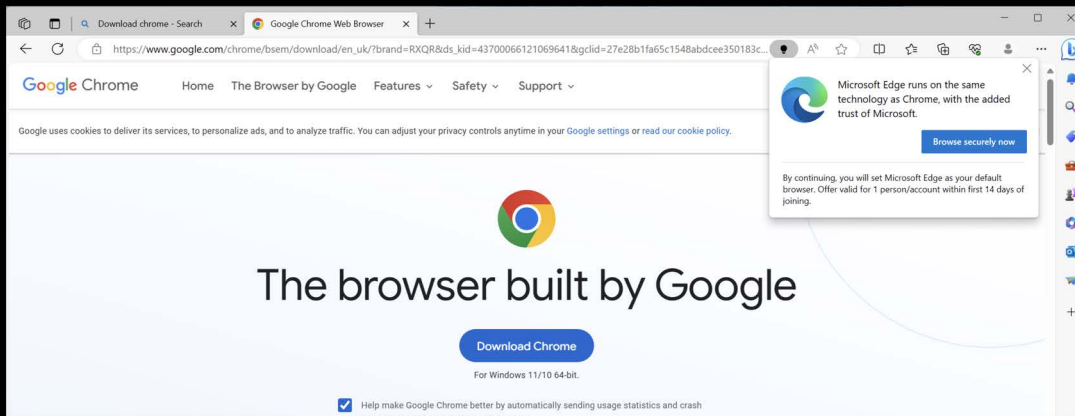
If the user is looking to download Google Chrome, Microsoft takes an even more aggressive approach, intervening twice more in the user journey (Figure 7)⁵⁸.

58 This behaviour was observed multiple times. The screenshots in figure X were captured on October 14, 2023 using Windows 11 Pro, Version 22H2, Build 22621.1702, Windows Feature Experience Pack 1000.22641.1000.0 and Microsoft Edge Version 117.0.2045.60. It was also observed on October 22, 2023 using Windows 11 Pro, Version 22H2, Build 22621.2283, Windows Feature Experience Pack 1000.22662.1000.0 and Microsoft Edge Version 118.0.2088.61. It was also observed on October 18, 2023 using Windows 10, Version 10.0.19044 Build 19044, Microsoft Edge Version 118.0.2088.46.

Step 1: the user enters a query indicating that they intend to download Google Chrome. Bing detects that they are using Edge and shows a large promoted message that discourages the user from continuing with their goal.



Step 2: if the user ignores the message and proceeds to the Chrome download page, Edge then shows an overlay containing a different message. On it, small text states "By continuing, you will set Microsoft Edge as your default browser".



Step 3: If the user ignores it starts downloading Google Chrome, Edge goes a step further and injects a large banner at the top of the google.com web page.

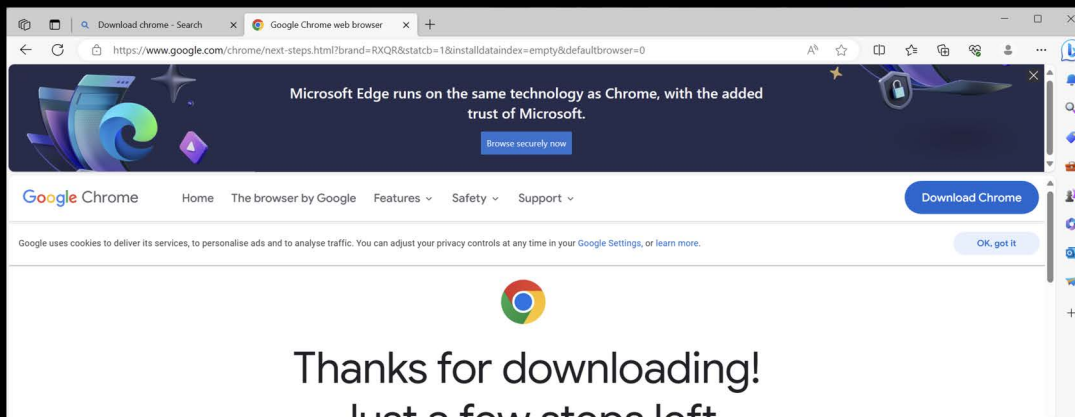


Figure 7: How Microsoft Edge Version 117 interferes with a user's decision-making when they try to download an alternative browser.⁵⁹

59 Captured on October 14, 2023 using Windows 11 Pro, Version 22H2, Build 22621.1702, Windows Feature Experience Pack 1000.22641.1000.0 and Microsoft Edge Version 117.0.2045.60.

If the user ignores the dissuasive banner in Step 1, they may scroll down and click a search result link to download Chrome, taking them to a page on google.com (step 2). Doing so triggers another message (Figure 8).

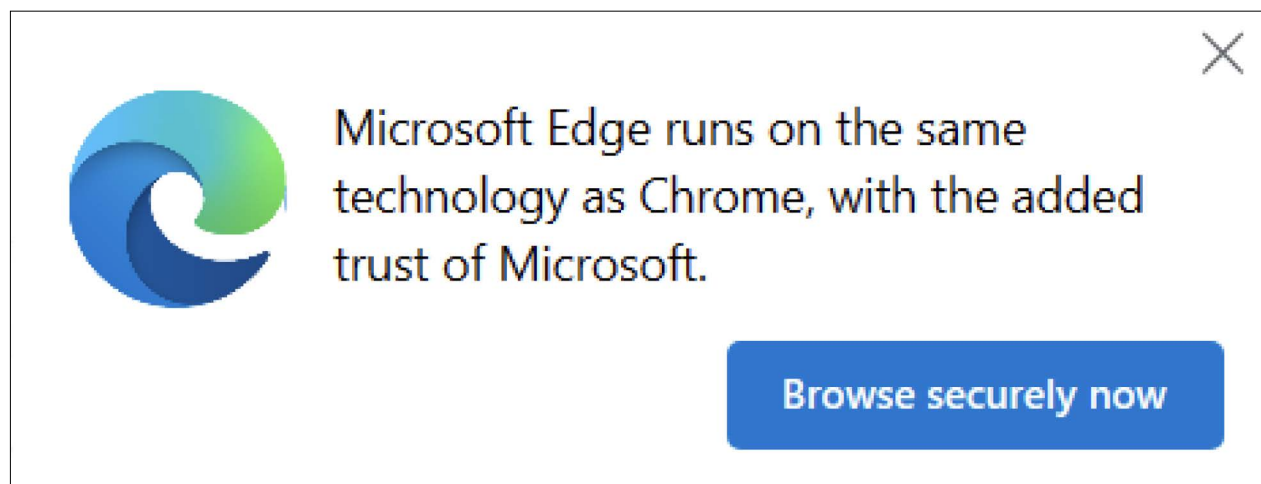


Figure 8: a close up of step 2, the message that the Edge browser displays when the user proceeds from the previous step to the Chrome download page⁶⁰.

This time, the message is powered by Edge itself, and uses interface components, fonts, and colours common to Edge menus such as Downloads or Favourites. It sits at the top-right of the application, typically overlapping the browser address bar, toolbar buttons, and some of the web page beneath it. These properties make it clear to users that the banner is not part of the web page: it is a popover message from the browser itself. Depending on the page the user reaches and the browser window's size, this message can easily obscure the primary 'Download Chrome' button on the page, adding extra friction to the download journey (Figure 9)⁶¹. This design uses **Visual Interference** to direct attention away from the user's desired goal, and arguably uses **Obstruction**⁶² if the popover obscures the download button, although it may be hard to know whether this is intentional.

60 Captured on November 14, 2023, using Windows 11 Pro, Version 22H2, Build 22621.2283, Windows Feature Experience Pack 1000.22662.1000.0. Note: we observed that Builds 22621.170, 19045.3570 and 22621.2283 contained two additional sentences below the button that appear to have been due to a bug (or mistake) so we have not included it in our analysis.

61 Screenshot taken on Windows 10 Home Version 22H2 Build 19045.3570 Windows Feature Experience Pack 1000.19052.1000.0 using Microsoft Edge Version 118.0.2088.61

62 Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Obstruction. Retrieved December 4, 2023, from <https://www.deceptive.design/types/obstruction>

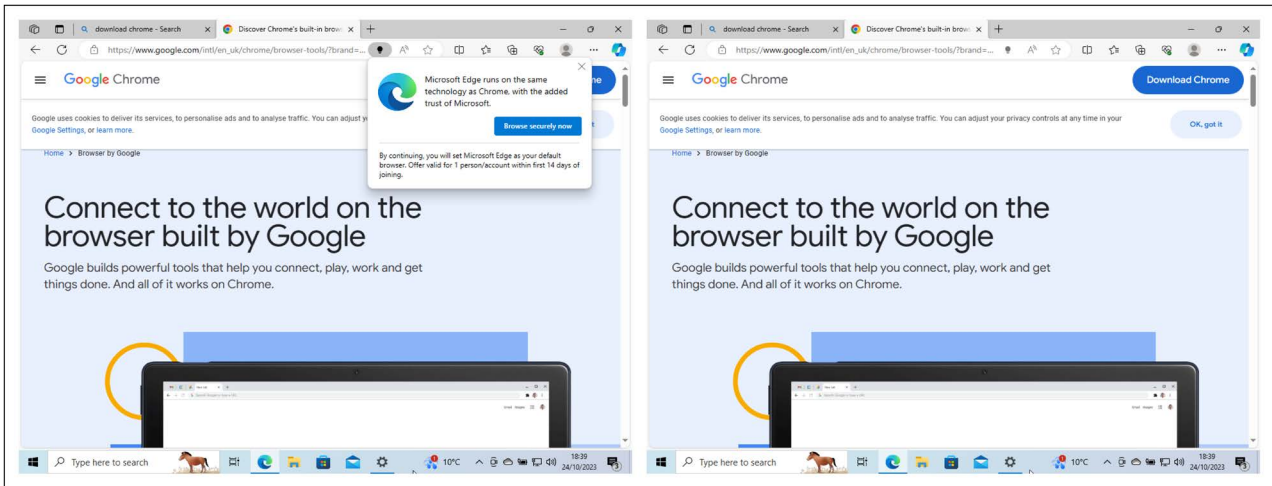


Figure 9: An example of step 2 where the “Download Chrome” button on google.com is obscured by the Edge message overlay (left: message obscures ‘Download Chrome’ button; right: button revealed after message is dismissed).

Again, this design takes advantage of the trust Microsoft has gained from the user in its custodial role as OS and application provider. The user may conclude the browser is telling them they’re about to do something dangerous or insecure, and that they should stop. In truth, this popover is merely an advertisement placed in a privileged position other advertisers cannot access. There is, however, no disclosure stating that this message is an advertisement. Therefore, this component is also another example of **Disguised Ads**.

If the user ignores this popover and initiates the Chrome download, Edge makes a final attempt to intervene, injecting a large, highly contrasting banner within the browser’s viewport, at the top of the page (Figure 10).

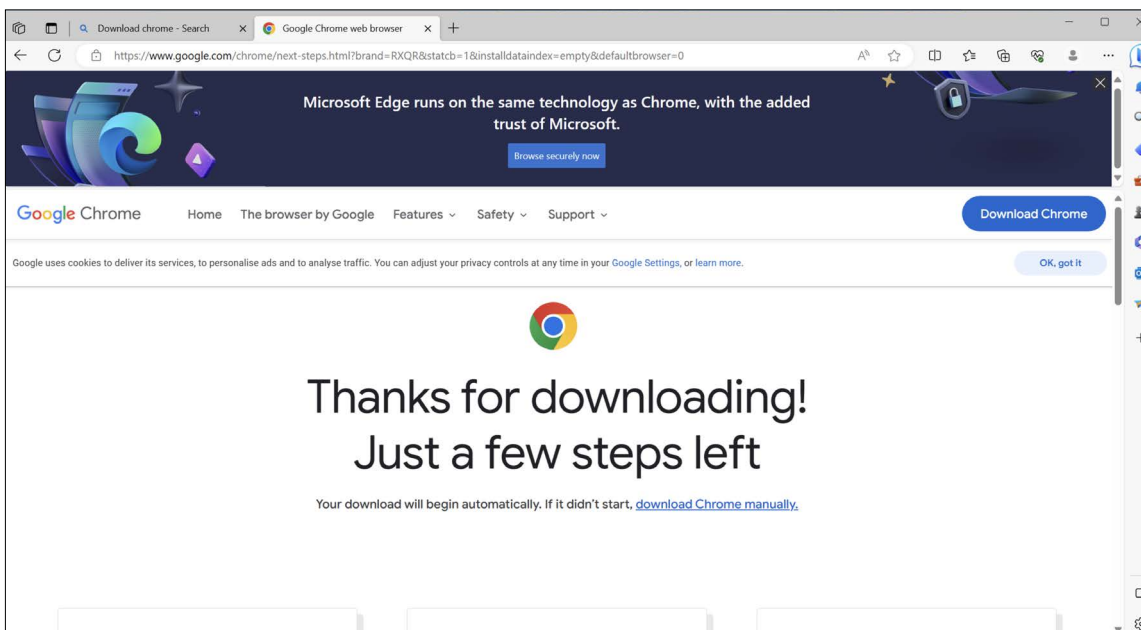


Figure 10: a close up of step 3, the message that Edge injects into the google.com Chrome download page when the user proceeds from the previous step.

This design is particularly problematic because it injects content directly into the rendering of a competitor's website, google.com.

Browser makers typically only intervene in the normal functioning of a browser for important security messages, such as 'Your connection isn't private', 'This site has been reported as unsafe', or 'There's a problem with this website's security certificate'. Once a secure connection has been established, content is normally⁶³ downloaded directly from the server and rendered in the viewport without manipulation.

We believe users may be alarmed when they see the Edge promotional message appear within the Chrome download page, reasoning that since the banner is unusual it must be very important. The primary button 'Browse securely now' may cause the user to conclude that since they've now received three escalating messages from Microsoft, apparently in its role as OS custodian, they'd better follow its guidance for fear of harming their system's security. Alternatively, since the text seems to have been served up by the google.com website itself, a user may conclude that Google itself is advocating the benefits of Microsoft Edge. This flagrantly unethical design therefore uses the **Visual Interference, Disguised Ads**, and **Trick Wording** patterns at the same time.

The flourishing of the web relies in part on honest co-operation and integration between various layers of infrastructure. Browsers sit atop operating systems, which run on devices, which in turn are built using components. The system also involves a range of agreed standards, such as communications protocols and web standards.

The main job of a web browser is to interpret and render web standards-compliant code and markup so a user can see and interact with it. Users trust their browser to do this fairly, without interfering with content, offering preferential treatment, or denying access to select users. Microsoft has chosen here to break this bargain and to damage the interoperability that underpins the modern web. For a browser vendor to interfere with the contents of a competitor's website – or indeed any website – with neither due cause nor user consent is highly irregular and ethically indefensible.

63 The exception here is when users knowingly opt in to features that modify web pages on their behalf, e.g. browser extensions such as ad-blockers or browser features such as 'reader mode'.

In addition to the interventions above, at the time of writing (October 2023) we observed Microsoft running a survey when Edge users download Chrome. This was also reported by various tech journalists^{64,65}. Although surveys are a normal research practice, the way Microsoft executed this interferes with the browser viewport, shrinking it from the right hand side via Edge's 'Action center' sidebar (Figure 11)⁶⁶.

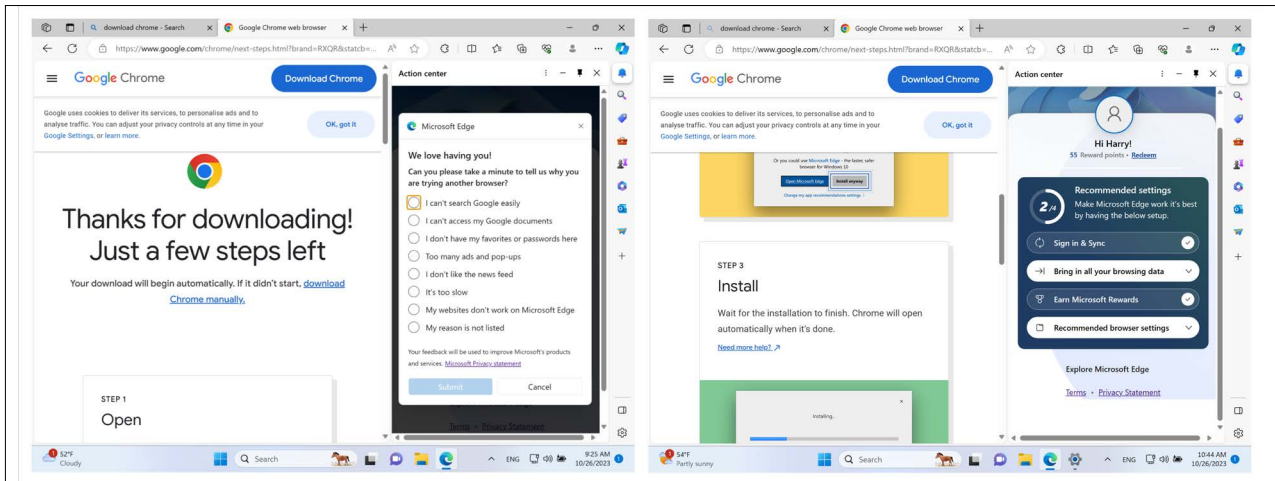


Figure 11: The Edge exit survey that currently appears when users download Chrome (left) and the post-survey page (right).

The purpose of the google.com page in question is to explain how to install Chrome, having downloaded it (Figure 11, left). If the user completes the survey, they are taken to a new page in the Action center (Figure 11, right) which invites them to complete Edge-related tasks to 'Make Microsoft Edge work it's [sic] best by having the below setup'. These tasks are: 'Sign in & Sync', 'Bring in all your browsing data', 'Earn Microsoft Rewards', and 'Recommended browser settings'.

All considered, we deem this survey and its subsequent page an example of **Obstruction** that makes it harder for users to complete Chrome installation.

64 Hollister, S. (2023, October 25). Microsoft now thirstily injects a poll when you download Google Chrome - The Verge. Retrieved October 29, 2023, from The Verge website: <https://www.theverge.com/23930960/microsoft-edge-google-chrome-poll-why-try-another-browser>

65 Buria, T. (2023, October 23). Microsoft now wants you to take a poll before installing Google Chrome - Neowin. Retrieved October 29, 2023, from <https://www.neowin.net/news/microsoft-now-wants-you-to-take-a-poll-before-installing-google-chrome/>

66 Screenshot taken on October 26 using Microsoft Edge Version 118.0.2088.69 on Windows 11 Pro Version 22H2 Build 22621.2428 Windows Feature Experience Pack 1000.22674.1000.0

Q2: Do Windows and Edge allow users to set a different browser as their default without harmful interference?

Using Windows 10 Settings to change default browser

When a Windows 10 user tries to change their default browser using the Windows Settings app⁶⁷, the OS intervenes in several ways (Figure 12)⁶⁸.

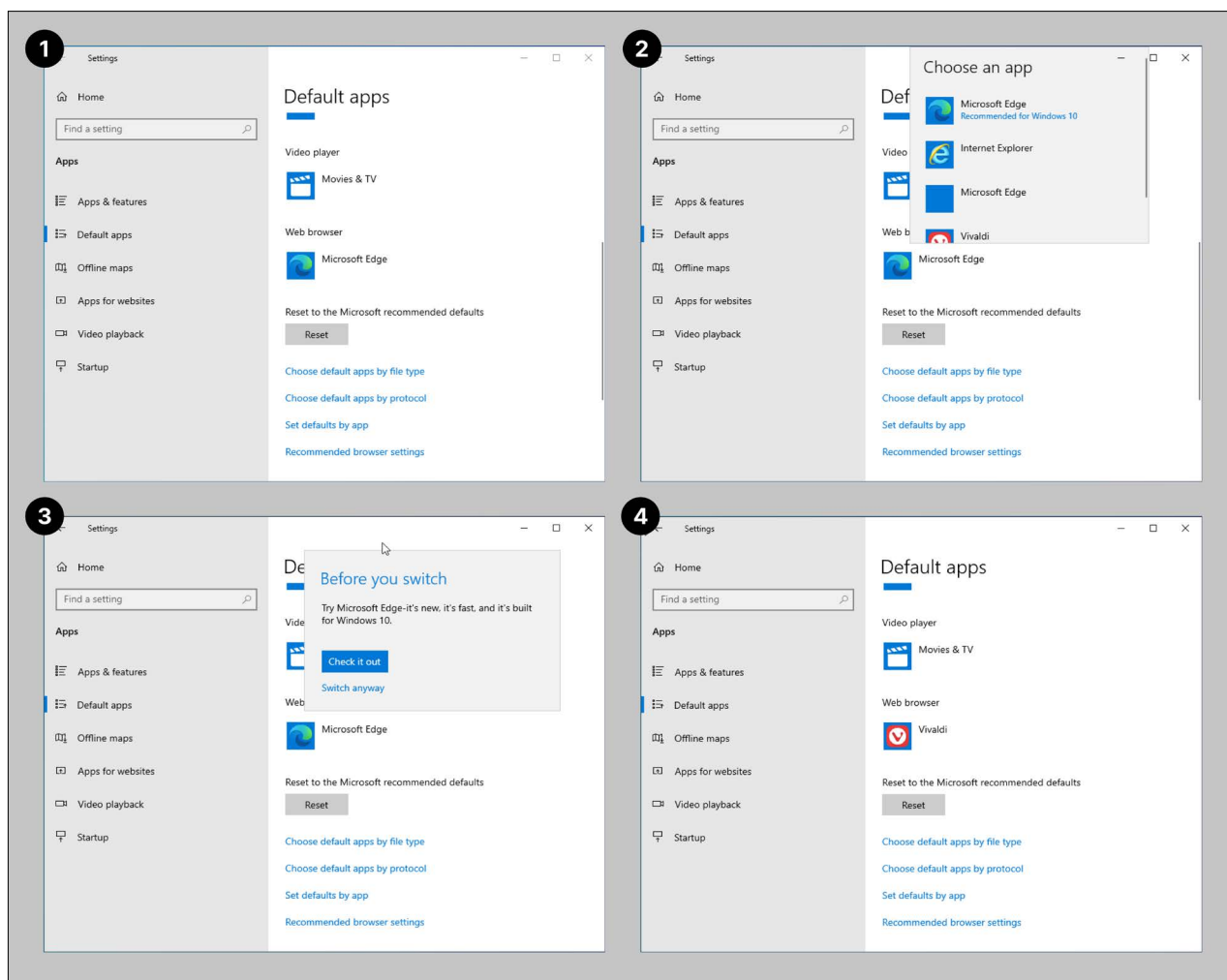


Figure 12: the steps involved in changing the default browser in the Windows 10 Settings app

67 Observed on November 26, 2023 using the Settings app in Windows 10 Home, Version 22H2, Build 19045.2965, Windows Feature Experience Pack 1000.19041.1000.0

68 Screenshot taken on Windows 10 Home, Version 22H2, Build 19045.2965, Windows Feature Experience Pack 1000.19041.1000.0

- **Steps 1 and 2:** when the user tries to change the default browser away from Edge, the app adds a promotional subtitle to the Edge listing: 'Recommended for Windows 10'. No other browser has such a subtitle.
- **Steps 3 and 4:** if the user persists with their goal of changing the default browser, the Settings app interrupts with a dialog: 'Before you switch / Try Microsoft Edge-it's fast and it's built for Windows 10'. Switching the default away from Edge therefore takes an extra click (and the effort of ignoring the message), while switching the default away from any other browser does not.

This is another example of the **Obstruction** pattern. By adding an extra step, Microsoft is favouring its own browser and making it harder for a user to choose an alternative. We did not observe the Windows 11 Settings app behaving in this manner.

File extension and link handling in Windows 11 Settings's 'Set default'

In the Windows 11 Settings app, when a user navigates to the 'Default apps' page for a web browser (e.g. Apps > Default apps > Firefox), they are shown a button at the top of the page allowing them to set that browser as their default. However, after the user clicks this button, many file extensions and link types are left with the previous default unchanged. On a fresh Windows installation, all relevant defaults are initially set to Edge, meaning Edge remains the default for these extensions and links even though a user has pressed 'Set default' (Figure 13)⁶⁹ for an alternative browser.

69 Screenshot taken on October 27, 2023 using Windows 11 Pro Version 22H2 Build 22621.1702 Windows Feature Experience Pack 1000.22641.1000.0

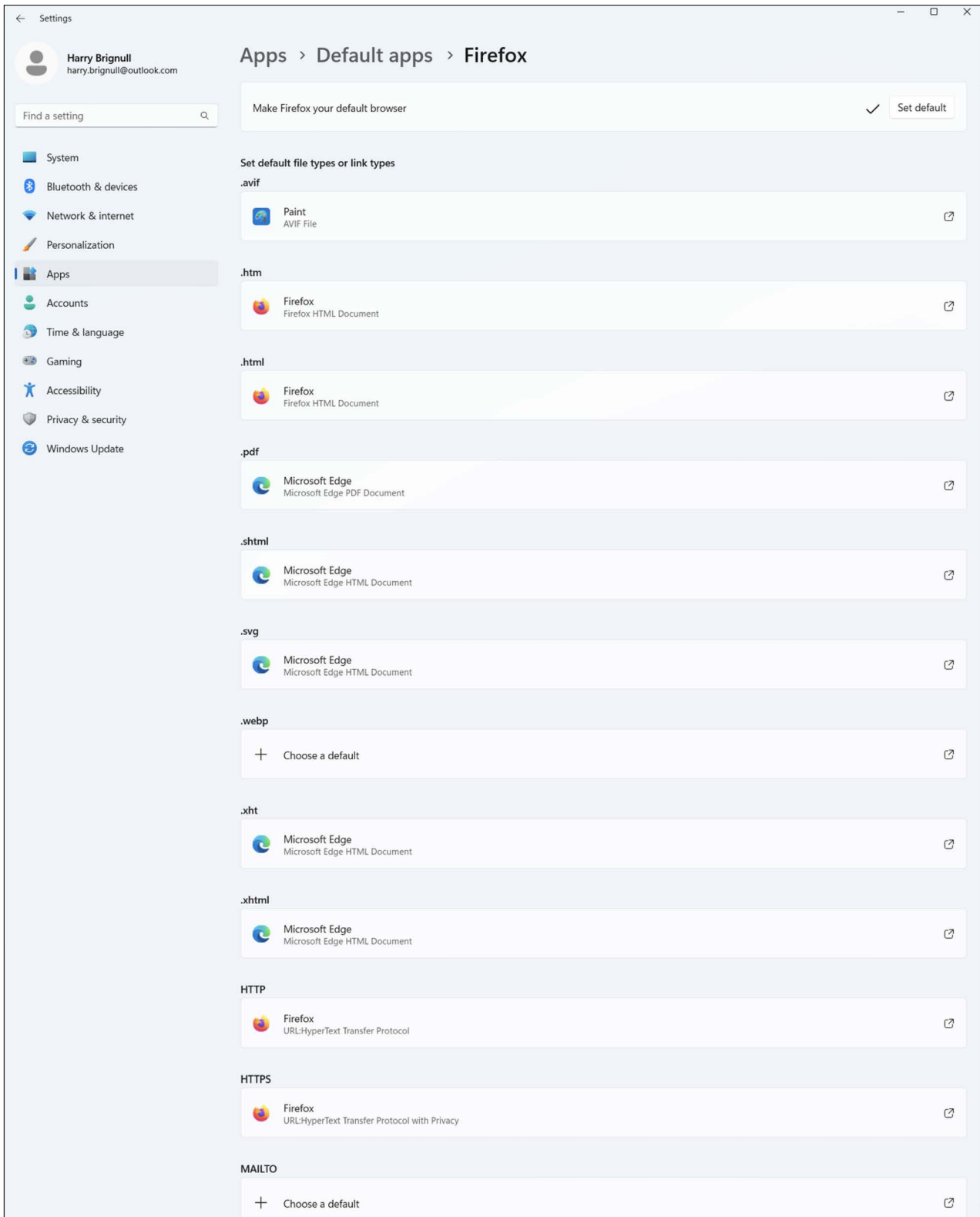


Figure 13: The Windows 11 settings app ignores some file types when the user presses “set default” for an alternative browser

In figure 13 above, a number of file types are still associated with Edge, despite the user having just assigned Firefox as their default browser. shtml, .xht and .xhtml are all web page file types: they typically comprise markup that browsers can open and render. The format

.svg is also a web standard, developed by the World Wide Web Consortium⁷⁰ as a means to render graphics within a web page. Since the Settings app fails to set these four file types as default, Edge will fire up to open these file types locally, even though the user has told the OS they wish to use a different default browser. The .pdf file type, being a desktop publishing format, is not closely related to everyday web browsing, although most modern browsers let users open, and sometimes edit, .pdf files.

This design uses the **Obstruction** pattern, with the additional steps making it harder for the user to get their way.

Using 'Set as default' in browsers other than Edge

It has historically been common for web browsers to be able to set themselves as the default handler for all web file types and protocols with a 'one-click' action: the user would click 'set as default', or some similarly labelled button, and the change would occur instantly.

Things are no longer as straightforward. Sources claim^{71,72} that in 2021, Microsoft blocked third-party browsers from using one-click set-as-default by changing how defaults are set via the Windows registry. These sources report that Mozilla responded by trying to reverse-engineer this mechanism. There are valid reasons to prevent third-party apps directly manipulating the Windows registry, specifically to prevent malicious apps from harming users. However, it was only in March 2023 that Microsoft clarified the situation, proposing a new 'principled approach' to app defaults⁷³. Since reliable public information is scarce and archival analysis is beyond the scope of this report, we did not investigate these historical claims.

70 W3C. (2018, October 4). Scalable Vector Graphics (SVG) 2 W3C Candidate Recommendation. Retrieved December 4, 2023 from <https://www.w3.org/TR/SVG2/>

71 Humphries, M. (2021, September 14). Firefox Now Uses a One-Click Process to Become Default Browser | PCMag. Retrieved October 26, 2023, from <https://www.pcmag.com/news/firefox-now-uses-a-one-click-process-to-become-default-browser>

72 Warren, T. (2021, September 13). Mozilla has defeated Microsoft's default browser protections in Windows - The Verge. Retrieved October 26, 2023, from The Verge website: <https://www.theverge.com/2021/9/13/22671182/mozilla-default-browser-windows-protections-firefox>

73 Roth, T., & Grady, A. (2023, March 17). A principled approach to app pinning and app defaults in Windows | Windows Experience Blog. Retrieved October 26, 2023, from <https://blogs.windows.com/windowsexperience/2023/03/17/a-principled-approach-to-app-pinning-and-app-defaults-in-windows/>

Q3: Do Windows and Edge respect the user's choice of default browser and allow them to continue using it without harmful interference?

'Let's finish setting up your PC' on Windows 10

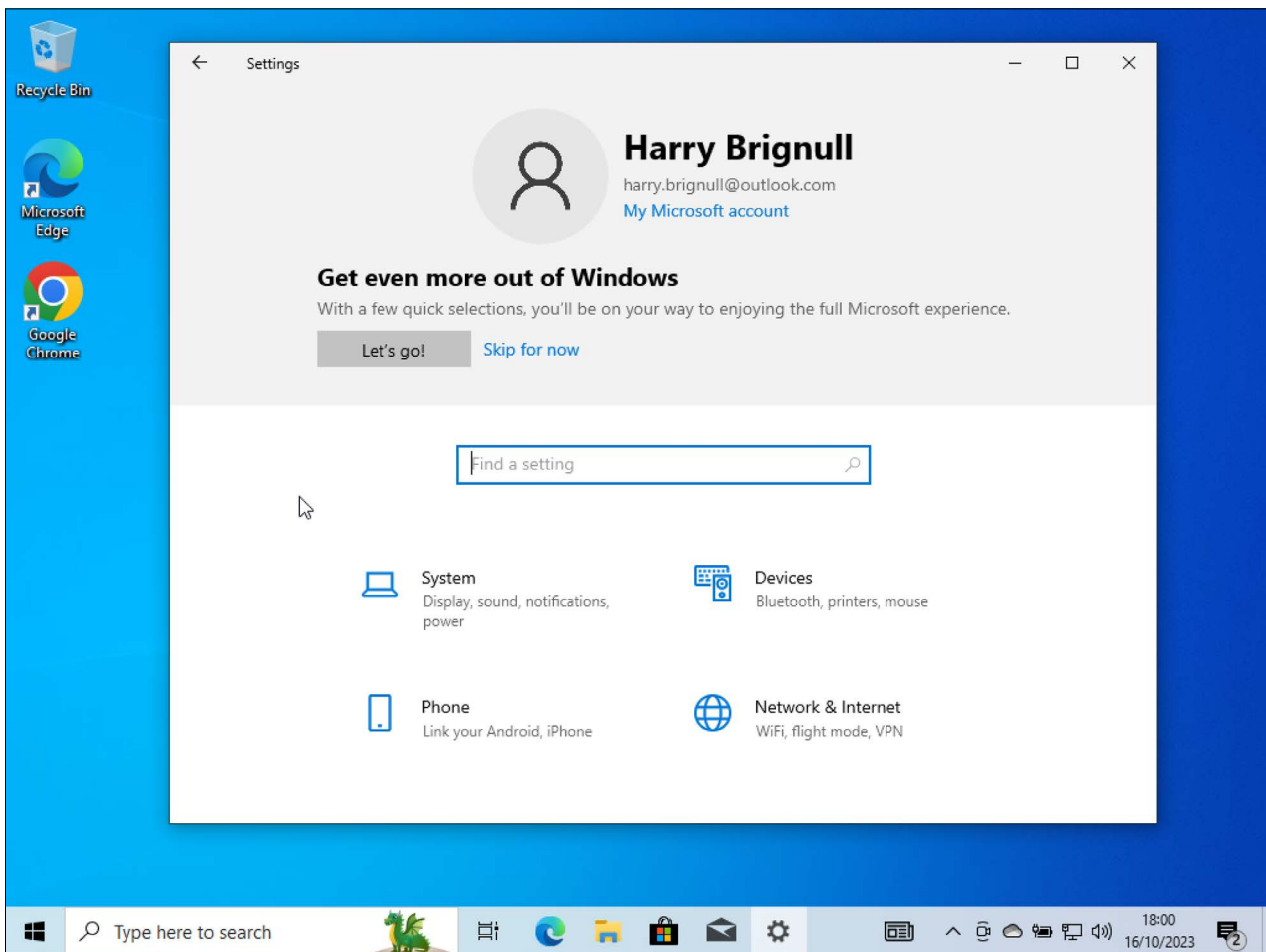


Figure 14: the Windows 10 Settings app, featuring a prominent call to action to “Get even more out of Windows”

The Windows 10 Settings app contains a prominent call to action: ‘Get even more out of Windows’ (figure 14, above)⁷⁴. When clicked, this opens the full-screen ‘Let’s finish setting up your PC’ flow. The first page of this flow (figure 15) lists the coming steps.

74 This was observed on 16/10/2023 using Windows 10 Home, Version 22H2, Build 19045.29.65 Windows Feature Experience Pack 1000.19041.1000.0

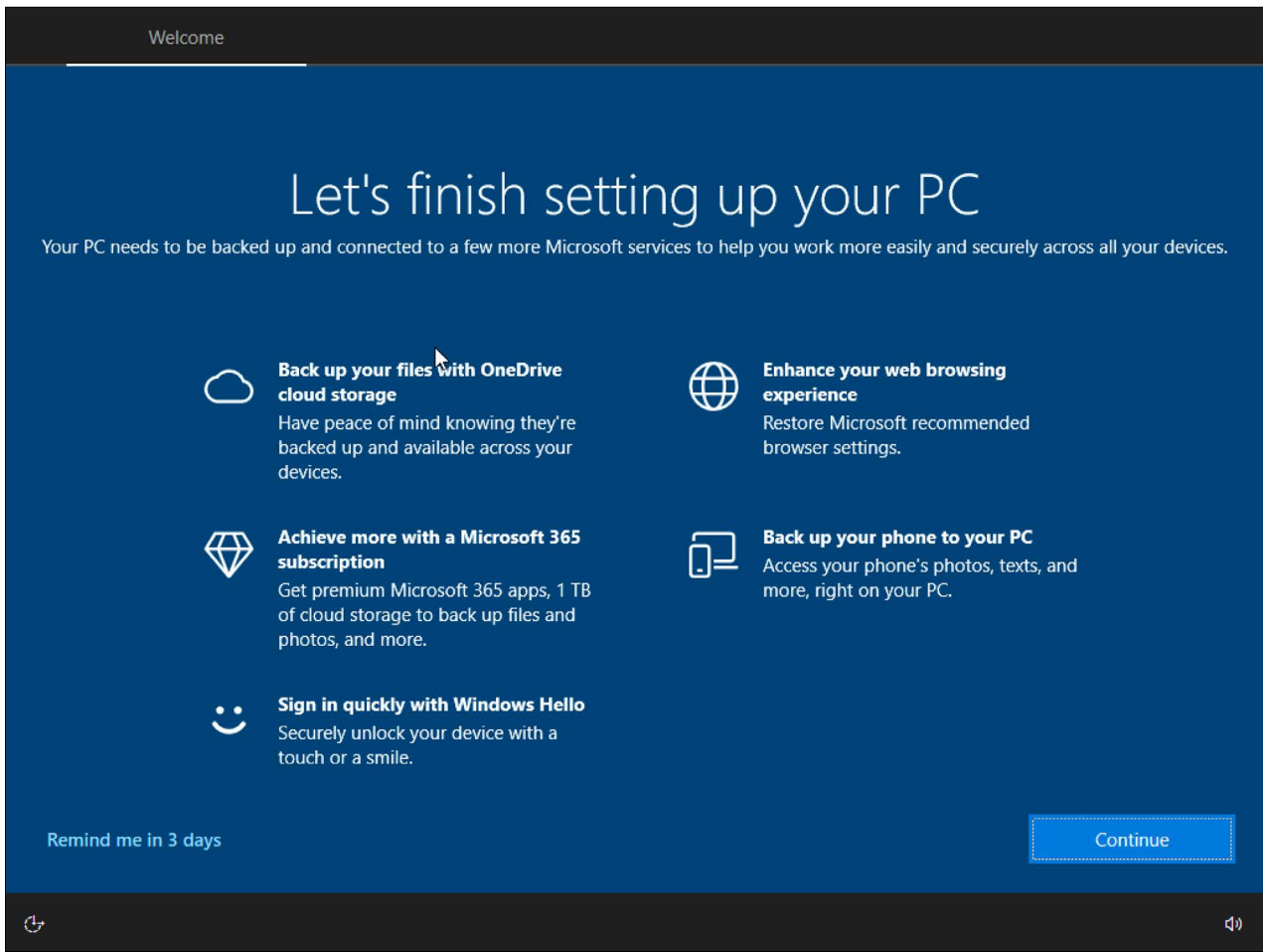


Figure 15: the first page of the “Let’s finish setting up your PC” app, featuring the misleading title “Enhance your web browsing experience” and subtitle “Restore Microsoft recommended browser settings”

A quick glance might suggest the prominent Continue button is the only clickable element. It is common for users to skim text and interface elements rather than read them in detail, meaning a user is likely to draw this immediate conclusion. However, there is a second option: the ‘Remind me in 3 days’ link at bottom-left, presented in such a diminutive way that some users will not notice it or read it. This design uses **Visual Interference** to direct attention towards the Continue button and away from the negative action.

It appears Windows 10 sometimes opens this flow without the user requesting it, such as after an OS update. We were not able to find detailed and reliable data on how often Microsoft carried out triggered interventions. However, social media posts reveal that some users regard them as annoying, unwanted intrusions. One Reddit user commented ‘Using Win10 for 7 years and suddenly I need to finish setting up my device? [...] I don’t remember asking you a goddamn thing’⁷⁵ while another said ‘Microsoft in my opinion is getting to be well known naggers [sic] [...] this screen and others like it should never be reappearing several

75 [_Typhoon_Delta_](https://www.reddit.com/r/pcmasterrace/comments/106mkli/using_win10_for_7_years_and_suddenly_i_need_to/). (2023, January 8). Using Win10 for 7 years and suddenly I need to finish setting up my device? They got real prodigies working at microsoft : r/pcmasterrace. Retrieved October 20, 2023, from https://www.reddit.com/r/pcmasterrace/comments/106mkli/using_win10_for_7_years_and_suddenly_i_need_to/

months after any Windows installation⁷⁶. Replies to these posts include ‘i have finished setting my device up like 3 times’, ‘I have had to do this multiple times’, ‘I do get one about once a month’, and ‘Microsoft’s nagging and pestering grates on me.’

Let’s examine another item on this initial screen. At the top right, we see a heading ‘Enhance your web browsing experience’, with the subtitle ‘Restore Microsoft recommended browser settings’ (figure 16).

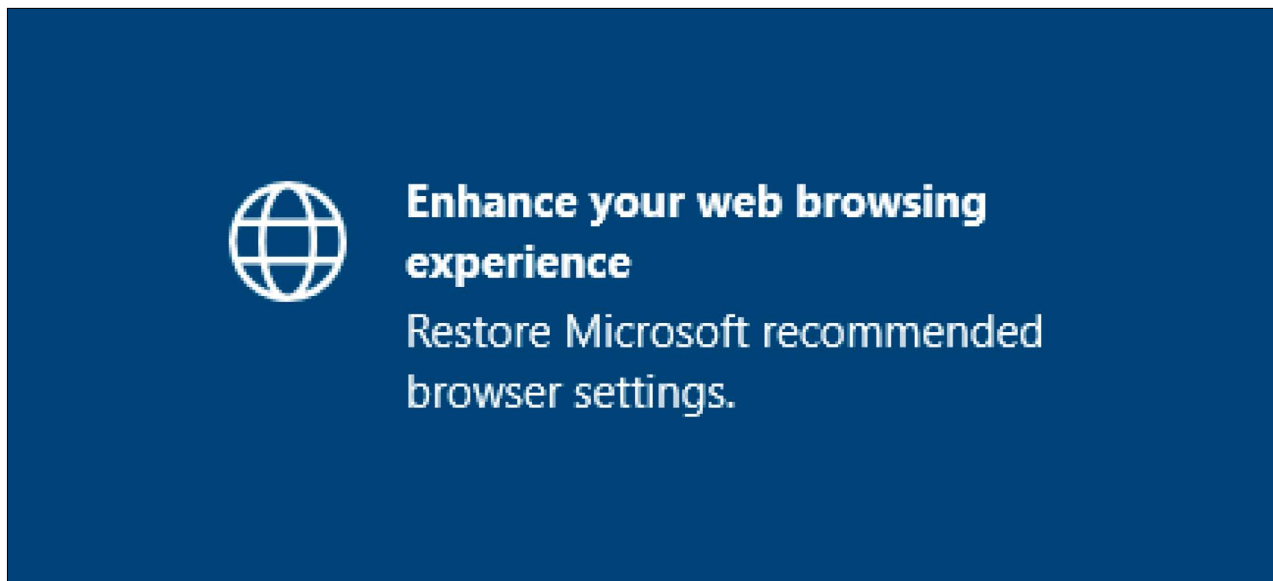


Figure 16: close-up of the misleading element on the first page of the “Let’s finish setting up your PC” app.

This is an example of the **Trick Wording** pattern: the unclear language can easily mislead the reader. The software has detected that the user has set a different browser to Edge as their default browser. Unless the user is paying close attention to the wording presented to them, following the next screen the user will have their default browser switched back to Edge.

On this subsequent screen, Microsoft uses the **Preselection** pattern (figure 17).

76 Gamer7928. (2022, May 6). “Let’s finish setting up your device” several months later : r/Windows10. Retrieved October 20, 2023, from https://www.reddit.com/r/Windows10/comments/ujtxix/lets_finish_setting_up_your_device_several_months/

Use Microsoft's recommended browser settings

This will set Microsoft Edge as your default browser. We'll pin shortcuts to your desktop and taskbar.



✓ **Built for Windows**
Surf the web using the only browser optimised for Windows. You'll find features to help you save money, time and battery while you browse.

Skip for now

Use recommended settings

Figure 17: the second step of the Windows 10 'Let's finish setting up your PC' flow.

If the user does not read this screen carefully, they are likely to click the prominent 'Use recommended settings' button without realising this will change their default browser to Edge. In this scenario, the user has not actively consented to this change happening, but the response that favours Microsoft was preselected in the design.

The screen's main heading 'Use Microsoft's recommended browser settings' gives no hint that the default browser will be changed. The only text that explains what is really happening is the much smaller sentence 'This will set Microsoft Edge as your default browser.' In journalism this is known as 'burying the lede': the most important point in the article is hidden deep in the text and cannot be discerned from the title or by scan-reading the page's prominent elements⁷⁷.

There is a way for the user to avoid having their default browser switched to Edge, but it is not immediately clear. The user must click the diminutive 'Skip for now' link. As with the previous 'Remind me in 3 days' link, this is designed in a manner that makes it very easy to miss.

77 For a more detailed discussion regarding the manipulative or deceptive use of scan reading, refer to: Brignull, H. (2023). *Deceptive Patterns: Exposing the Tricks Tech Companies Use to Control You*. Testimonium Ltd. Retrieved from <https://www.deceptive.design/book>

In all, this single screen uses multiple harmful patterns – specifically **Preselection**, **Visual Interference**, and **Trick Wording** – to skew users towards doing what Microsoft wants: changing the default browser back to Edge. Unless users are paying close attention, this change may occur without their understanding or consent.

Again it is easy to imagine a fairer design. For example, the screen could give users a clear instruction (e.g. ‘Choose your default web browser’), and present options as a mandatory radio button group. This would mean that a user could not proceed to the next page accidentally – they have to pick a radio button first – and would therefore avoid the harmful effects of the patterns identified above.

This screen (figure 17) directly opposes several of Microsoft’s own design guidelines⁷⁸:

- ‘Clearly identify the issue or the user’s objective in the first line of the dialog’s text.’⁷⁹ This screen does the inverse, using a misdirectional title (‘Use Microsoft’s recommended browser settings’) that hides the true purpose of the page.
- ‘Make sure the purpose and state of a button are clear to the user.’⁸⁰ This screen does the inverse, using a button label (‘Use recommended settings’) that, again, hides its true purpose.
- ‘Ensure that your dialog has at least one button corresponding to a safe, nondestructive action like ‘Got it!’, ‘Close’, or ‘Cancel!’.’⁸¹ This page does the inverse, offering no such button. Instead there is only a small, low-visibility hyperlink tucked in the far corner of the screen.
- ‘Only use hyperlinks for navigation; don’t use them for other actions.’⁸² Microsoft explicitly recommends against using hyperlinks for actions, yet this page uses a hyperlink for the ‘Skip for now’ action. This should be a button. This decision hides the action, making it more likely a user will fail to notice and understand it.

Microsoft’s justifications of these principles are noteworthy. In an article published by the Microsoft Design team, the authors say their principles are ‘grounded in our deep understanding of how customers navigate the world’⁸³. Although the ‘Let’s finish setting up your

78 Microsoft. (n.d.). Design principles - Fluent 2 Design System. Retrieved October 20, 2023, from <https://fluent2.microsoft.design/design-principles>

79 Microsoft. (2023, March 16). Dialog controls - Windows apps | Microsoft Learn. Retrieved October 20, 2023, from <https://learn.microsoft.com/en-us/windows/apps/design/controls/dialogs-and-flyouts/dialogs>

80 Microsoft. (2023, March 16). Buttons - Windows apps | Microsoft Learn. Retrieved October 20, 2023, from <https://learn.microsoft.com/en-us/windows/apps/design/controls/buttons>

81 Microsoft. (2023, March 16). Ibid.

82 Microsoft. (2022, June 9). Hyperlinks - Windows apps | Microsoft Learn. Retrieved December 4, 2023, from <https://learn.microsoft.com/en-us/windows/apps/design/controls/hyperlinks>

83 Microsoft Design. (2021, October 22). Four Principles for the Future of Design. Retrieved December 4, 2023 from <https://medium.com/microsoft-design/four-principles-for-the-future-of-design-78922340cece>

PC' flow pre-dates the publication of these design principles, it is clear the company knows the psychology of how design affects users. This flow is designed in an unconventional and harmful manner that fails to meet Microsoft's own design standards and is likely to trip up many users. If Microsoft had made this page clear, predictable, and easy to read, users would be more able to make informed choices about browser defaults.

Social media posts suggest Microsoft has deployed many variants of this flow at different times, such as in the Windows 10 to 11 upgrade path, or in Windows 11 (see footnote⁸⁴ for three such apparent variants). We were not able to reproduce these flows and, since public records of them are poorly documented, we have not analysed them.

Using Windows 10 Settings after the 'Let's finish setting up your PC' flow

After the user has completed 'Let's finish setting up your PC', they may wish to set an alternative browser as their default later on. Windows 10 Settings here tries a different tactic, highlighting certain calls to action at the top of the screen with blue dots. These user interface components are called 'dot info badges'. Microsoft's documentation states 'An info badge should be used when you want to bring the user's focus to a certain area of your app'⁸⁵, meaning Windows users will learn when they see this dot is present, their attention is needed. If a user has changed their default browser to something other than Edge, an item 'Web browsing / Restore recommended' appears in the top-right, adorned with a dot info badge (figure 18). There is no genuine reason for the dot info badge to appear here, since the OS should work perfectly well with an alternative browser set as default. The only effect of this element is **Visual Interference**: it draws user attention to a flow that tries to induce browser switching.

84 Three social media posts that appear to depict variations of the same application:
July 2022, Windows 10 upgrade to 11: <https://www.youtube.com/watch?v=ym7NFq1ZmZI>
July 2021, version not specified: <https://www.youtube.com/watch?v=HkYY9mxym7E>
June 2023, Windows version not specified: <https://twitter.com/Steltek/status/1665081789033873409>

85 Microsoft. (2022, October 24). Info badge - Windows apps | Microsoft Learn. Retrieved October 22, 2023, from <https://learn.microsoft.com/en-us/windows/apps/design/controls/info-badge>

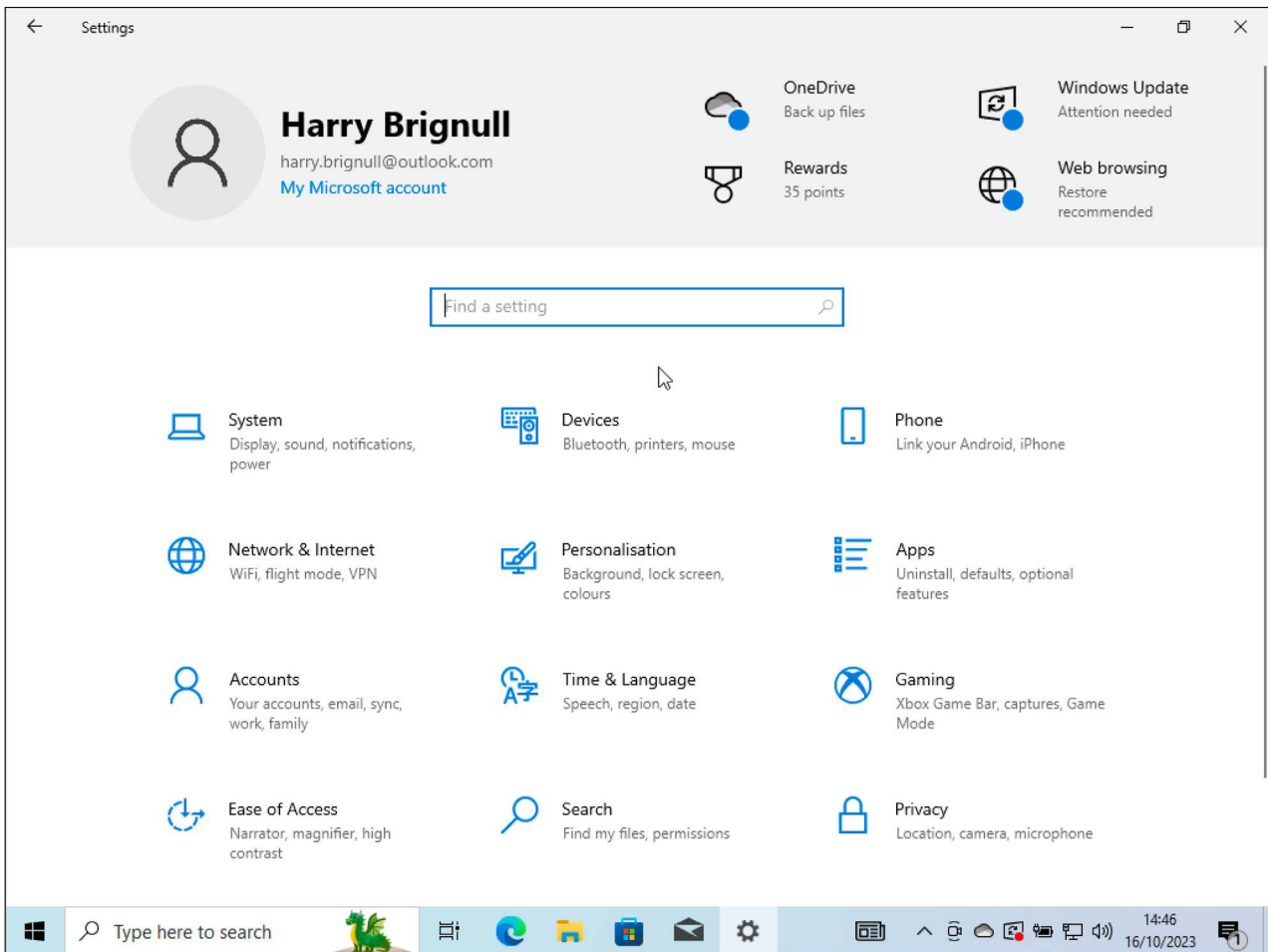


Figure 18: the Windows 10 Settings app, featuring a 'Web browsing / Restore recommended' call to action⁸⁶

Clicking the 'Web browsing / Restore recommended' call to action, opens a dialog box (figure 19).

86 Screenshot captured on October 16, 2023 using the settings app on Windows 10 Home, Version 22H2, Build 19045.29.65 Windows Feature Experience Pack 1000.19041.1000.0

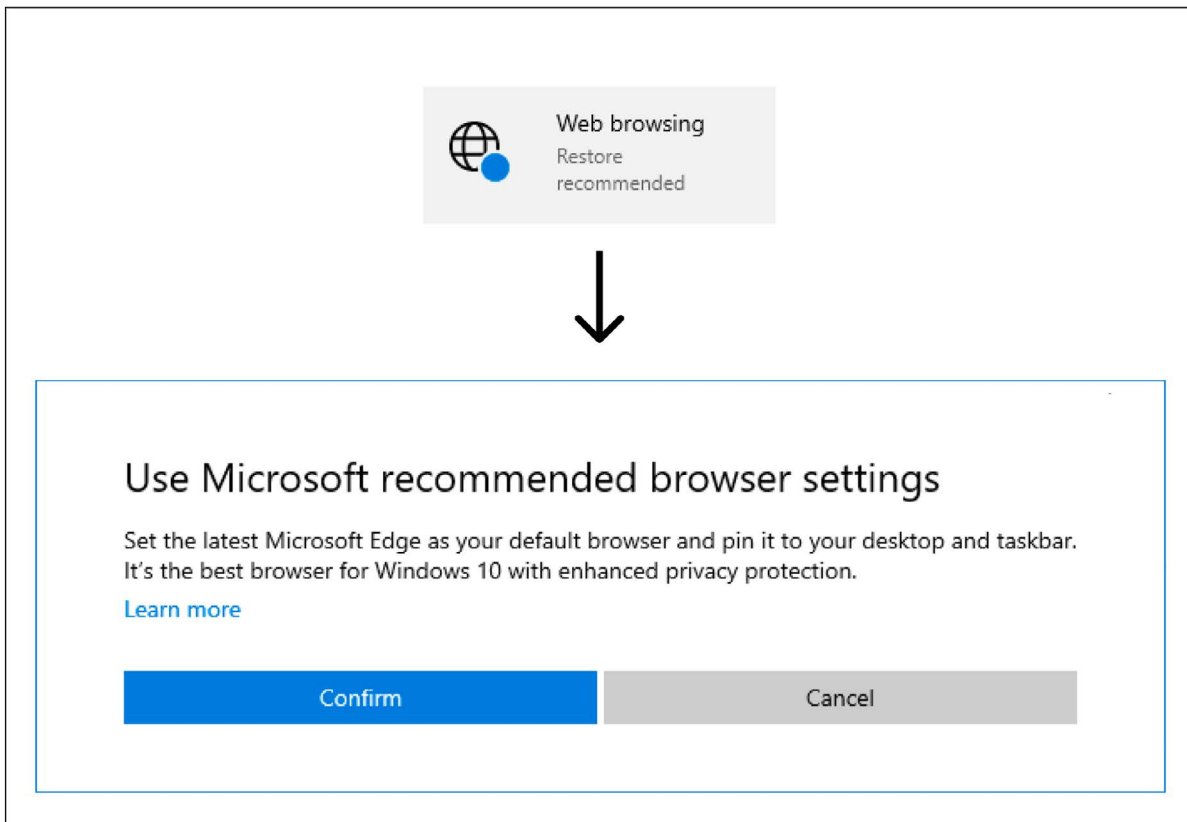


Figure 19: The dialog box that appears when a user clicks the “Web browsing Restore recommended” call to action in the Windows 10 Settings app.

This interaction is problematic for two reasons. First, it is exclusive to Edge. As the owner of both Windows and Edge, Microsoft give themselves permission to inject this interaction into Windows 10 Settings app, but deny this permission to any other browser vendor. Secondly, this interaction again takes advantage of the trust users have in Microsoft’s custodian role as OS vendor. The call to action and dialog box don’t look like advertisements, and there is no advertising disclosure. Instead, the user may conclude the OS wants them to protect their privacy (‘Use Microsoft recommended browser settings ... enhanced privacy protection’) and diligently follow these instructions without realising they have a choice and that many modern web browsers provide comparable privacy protection. This design uses the harmful **Disguised Ads** and **Trick Wording** patterns.

Using Edge after the user has selected an alternative default browser

It is common for web browsers to invite users to set them as the default via a modal dialog, infobar or similar UI component. Browser vendors typically have the context of user intent, since the user has intentionally downloaded and installed the browser in the OS. Presenting the invitation to set a browser as default is therefore a justifiable interpretation of this context. Since it appears the user has chosen to use the browser, it’s reasonable to ask them if they want to set it as the default.

The context for Edge is different. There is only one reason for Edge *not* to be the default browser on Windows: the user has expressly chosen a different browser. Nevertheless, if Edge is subsequently opened – intentionally or otherwise – it will ask the user to restore it as the default browser (figure 20). If Edge has been opened without the user’s intent – which, as we will see below, can happen often – this is unjustified **Obstruction** in the user’s journey. We deem it acceptable, however, if the user intentionally opens Edge, since that might mean the user wants to try it out again.

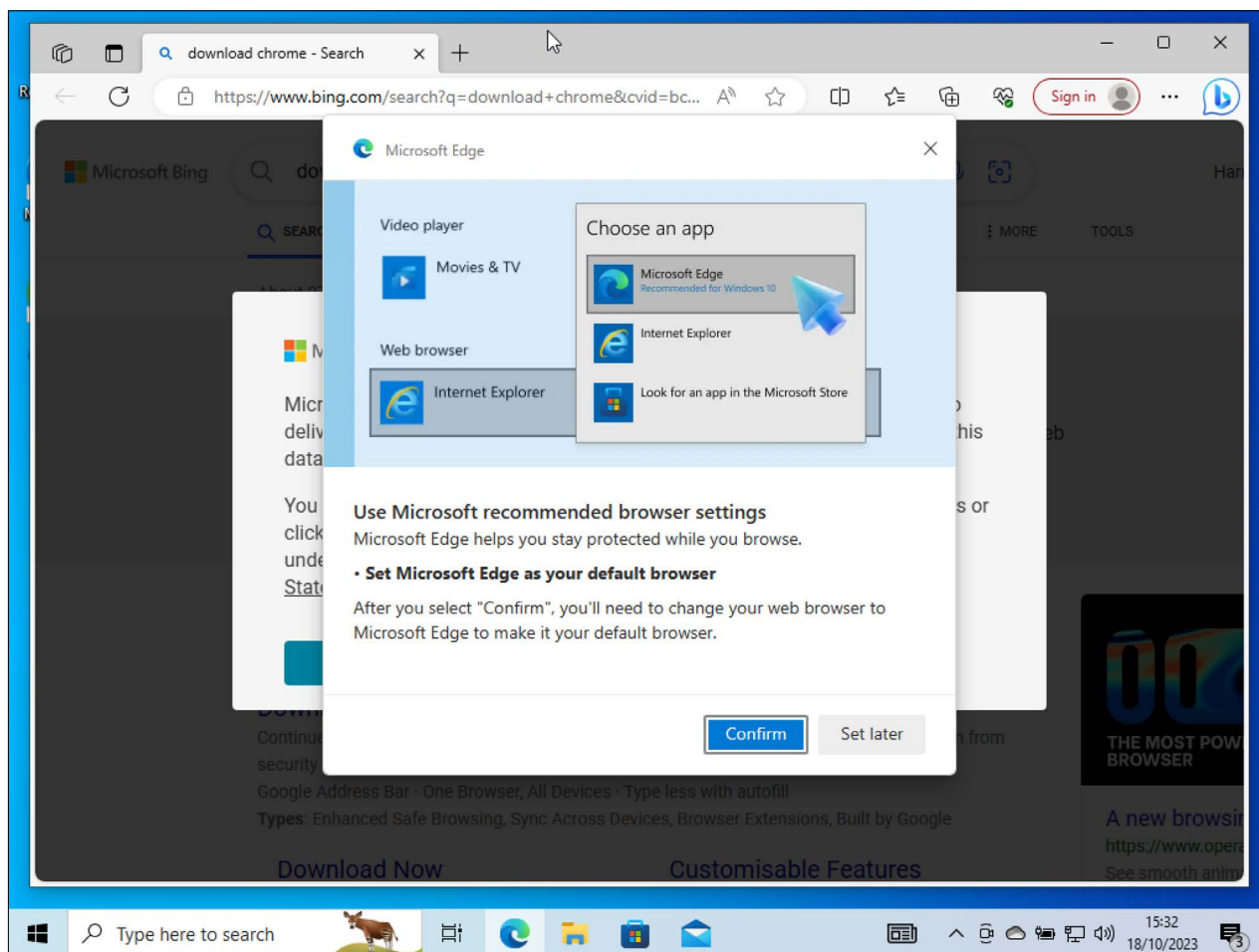


Figure 20: On Windows 10 and Edge 118, a dialog may appear if a user opens Edge after they have set another browser to be their default web browser⁸⁷.

Using the same versions of Windows 10 and Edge 118, we also observed Edge displaying an infobar UI component when the user had set an alternative browser as their default (figure 21)⁸⁸.

87 Observed on October 18, 2023 using Windows 10 Home, Version 22H2, Build 19045.29.65 Windows Feature Experience Pack 1000.19041.1000.0 and Microsoft Edge Version 118.0.2088.46

88 Observed on October 18, 2023 using Windows 10 Home, Version 22H2, Build 19045.29.65 Windows Feature Experience Pack 1000.19041.1000.0 and Microsoft Edge Version 118.0.2088.46

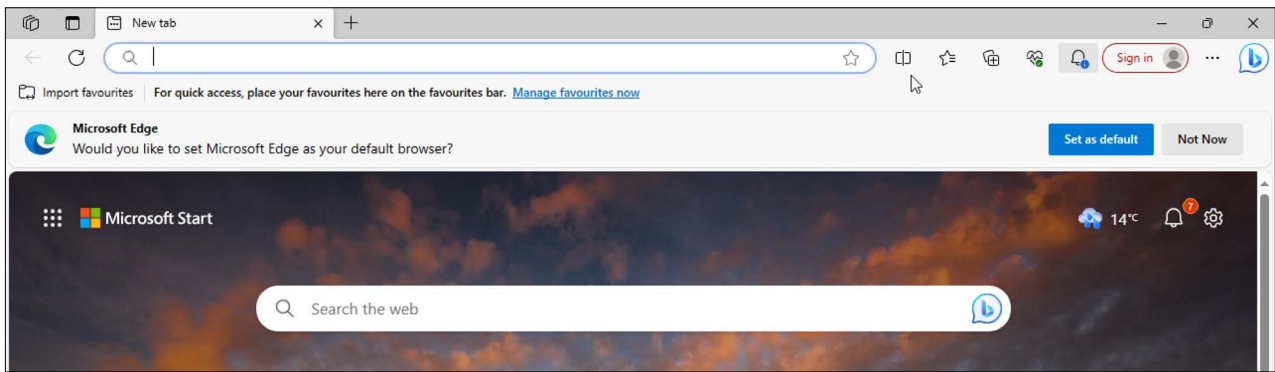


Figure 21: On Windows 10 and Edge 118, an infobar component may appear if a user opens Edge after they have set another browser to be their default web browser.

We were not able to ascertain the specific triggers for this behaviour, nor the frequency. However, various articles in the tech press claim it can be very frequent. A 2020 Forbes.com article⁸⁹ refers to it as ‘nagging’ that it is ‘getting worse and worse’, a 2021 article on Neowin⁹⁰ describes it as an ‘annoying alert’, and a 2021 article on Bleeping Computer⁹¹ states that ‘users have been reporting constant nag screens’. It is not entirely clear whether those reports refer to the Edge interventions described above or other interventions, given that Microsoft employs a number of different types in Windows and various other Microsoft applications, as described throughout this report.

A Windows Latest article published in May 2021 stated that Edge version 91 presented a slightly different dialog to many users (figure 22)⁹².

89 Collins, B. (2020, September 24). Windows 10 Nagging To Install Edge Is Getting Worse And Worse. Retrieved October 29, 2023, from Forbes website: <https://www.forbes.com/sites/barrycollins/2020/09/24/windows-10-nagging-to-install-edge-is-getting-worse-and-worse/?sh=7521e0863c15>

90 A., M. (2021, May 31). How to disable Microsoft Edge's annoying Bing recommendation alerts - Neowin. Retrieved October 29, 2023, from <https://www.neowin.net/guides/how-to-disable-microsoft-edges-annoying-bing-recommendation-alerts/>

91 Abrams, L. (2021, May 29). Microsoft Edge 91 brings new bugs and annoying popup messages. Retrieved October 29, 2023, from Bleeping Computer website: <https://www.bleepingcomputer.com/news/microsoft/microsoft-edge-91-brings-new-bugs-and-annoying-popup-messages/>

92 Parmer, M. (2021, May 30). Microsoft Edge nagging users with recommended browser settings alert. Retrieved December 4, 2023 from Windows Latest website: <https://www.windowslatest.com/2021/05/30/microsoft-edge-nagging-users-with-recommended-browser-settings-alert/>

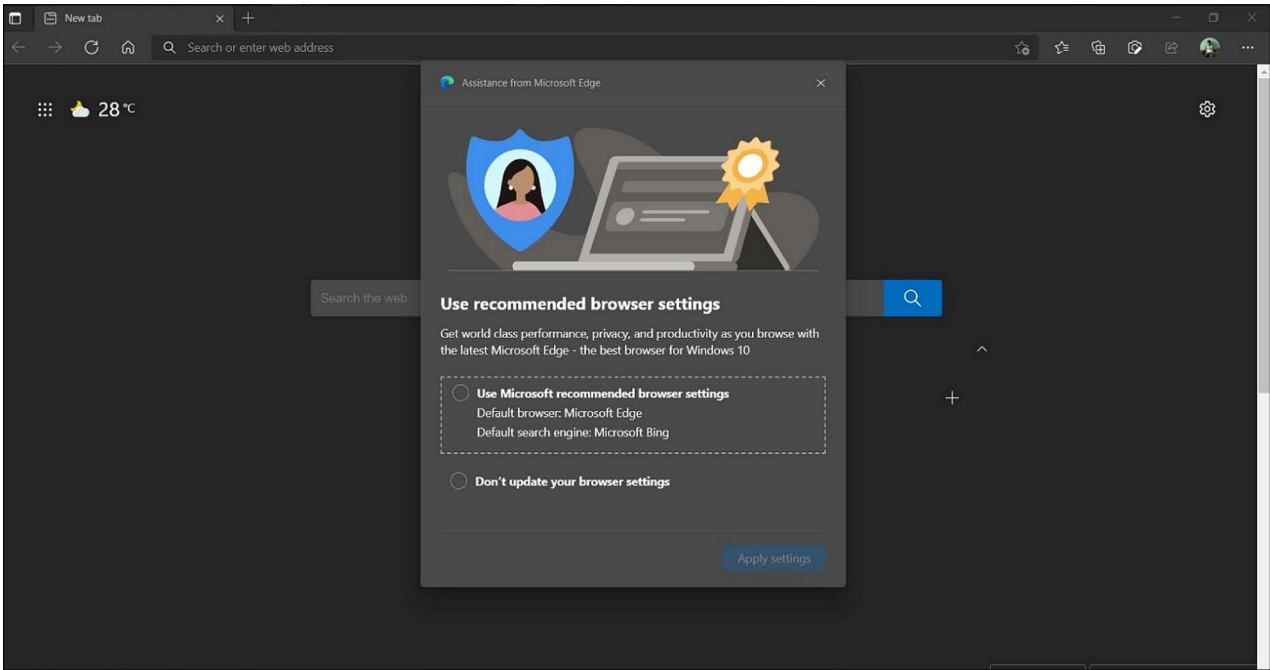


Figure 22: Screenshot from Windows Latest article Microsoft Edge nagging users with recommended browser settings alert.

In the same month, a user on the StackExchange 'Superuser' forum⁹³ noticed a similar issue (figure 23): 'I get this notification on lower right corner on Windows 10 from time to time [...] If I click "Maybe later" button the notification appears again in few [sic] days. I'm not using Edge browser. My search engine in Chrome is set to Google.'

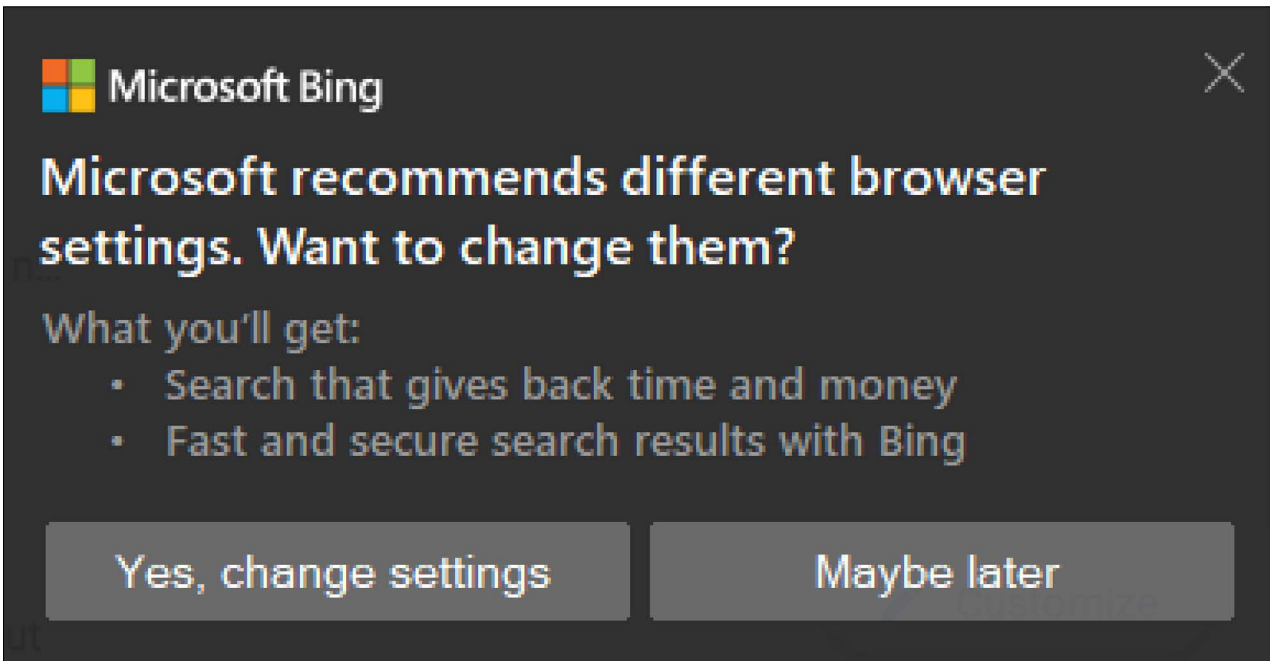


Figure 23: A user on the StackExchange Superuser forum in May 2021 claimed to see this 'toast' notification on their Windows 10 computer.

93 How to disable "Microsoft recommends different browser settings" notification? (n.d.). Super User. Retrieved January 5, 2024, from <https://superuser.com/questions/1652058/how-to-disable-microsoft-recommends-different-browser-settings-notification>

Using other Microsoft apps after selecting an alternative default browser

Taskbar Search

The Taskbar is a prominent Windows feature. Since it is almost always visible, it is valuable on-screen real estate. Taskbar Search is the largest component on the taskbar, positioned prominently in the centre unless the user chooses to modify or turn it off in Settings. Taskbar features are thus just a click away, making them easy to reach and use. As well as being prominent and reachable, Taskbar Search is undoubtedly useful, letting users search their apps, local files, cloud files, emails, settings, help, and more, all in one search box.

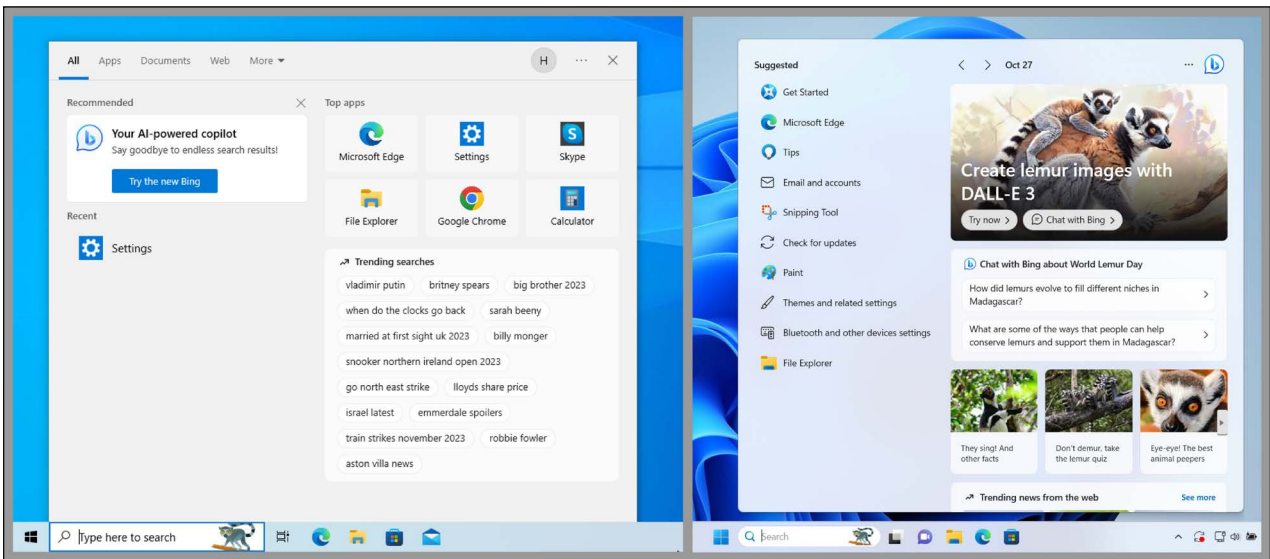


Figure 24: Taskbar Search on Windows 10⁹⁴ (left) and Windows 11⁹⁵ (right)

However, Taskbar Search has a limitation: it only works with Bing and Edge. All Taskbar Search results shown are powered by Bing, and when a user clicks one of these results it always opens in Edge, no matter which browser the user has set as default. Users cannot configure Taskbar Search to use their preferred search engine or chosen default browser, nor can they replace it with a third-party feature that integrates into the Taskbar in the same way. So if a user wants a search feature that works immediately, that is prominently placed on their taskbar for easy access, and is tightly integrated with all the apps and data they use, they only have one realistic choice: to use Taskbar Search, and therefore Edge and

94 Screenshot captured on October 27, 2023 on Windows 10 Home, Version 22H2, Build 19045.29.65 Windows Feature Experience Pack 1000.19041.1000.0

95 Screenshot captured on October 27 using Windows 11 Pro Version 22H2 Build 22621.1702 Windows Feature Experience Pack 1000.22641.1000.0

Bing. If they don't like the way Taskbar Search works, they must either accept it or deactivate it entirely, missing out on the benefits⁹⁶.

Users in online forums and on social media also report that the Windows Taskbar has been used to pester the user to switch their default browser back to Edge (figure 25), showing messages such as 'Still using Firefox? / Microsoft Edge is here' (left)⁹⁷ and 'Restore Microsoft recommended browser settings. Set Microsoft Edge as your default. Apply' (right)⁹⁸.

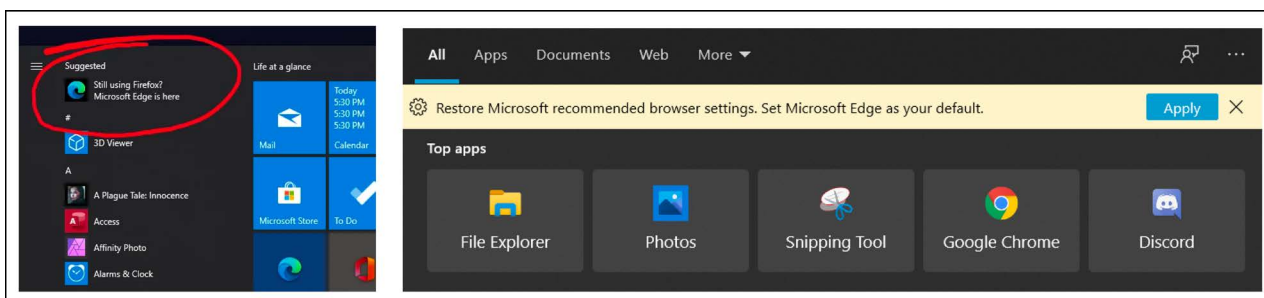


Figure 25: screenshots posted by Reddit users in the Windows 10 forum, showing the Taskbar Search feature nagging users

We note with interest that Taskbar Search's restrictions are overcome in certain countries. As announced in an August 2023 Microsoft blog post, 'Windows Search now uses the Microsoft Bing Search app to return web content and search results. In the European Economic Area (EEA), you can enable installed Microsoft Store apps that implement a web search provider to return web content and search results in Windows Search through Settings.'⁹⁹ We must presume this decision has been made to address regulatory concerns in these territories. Otherwise, once built, this functionality would surely be rolled out globally. This also demonstrates that there are no technical barriers to ensuring Taskbar Search respects the default browser selection.

96 To caveat: keen tinkerers and experts may be able to find third party apps that imitate a similar experience, but none of these apps can place their search feature in the same prominent position inside the taskbar.

97 This must be the most cringing suggestion text I have ever seen in win10. : r/Windows10. (2020, February 8). Retrieved October 23, 2023, from Reddit website: https://www.reddit.com/r/Windows10/comments/f0psu6/this_must_be_the_most_cringing_suggestion_text_i/

98 For the love of God stop trying to get users to switch back to Edge if they've changed their default browser. We don't want Microsoft playing shadow IT with our computers. : r/Windows10. (2020, September 12). Retrieved October 23, 2023, from Reddit website: https://www.reddit.com/r/Windows10/comments/jszpbf/for_the_love_of_god_stop_trying_to_get_users_to/

99 Langowski, A., LeBlanc, B. (2023, August 10). Announcing Windows 11 Insider Preview Build 23521. Retrieved December 4, 2023 from <https://blogs.windows.com/windows-insider/2023/08/10/announcing-windows-11-insider-preview-build-23521/>

Search Highlights

The Taskbar search box in both Windows 10 and 11 contains a small colourful graphic, periodically updated (figure 26). Microsoft calls this feature 'Search Highlights', and describes it as 'designed to help Windows users discover more information and related content, search highlights present noteworthy, informative, and interesting information of what's special about each day [...] including fun illustrations and text in the search box, which help you stay connected, and be productive..'¹⁰⁰

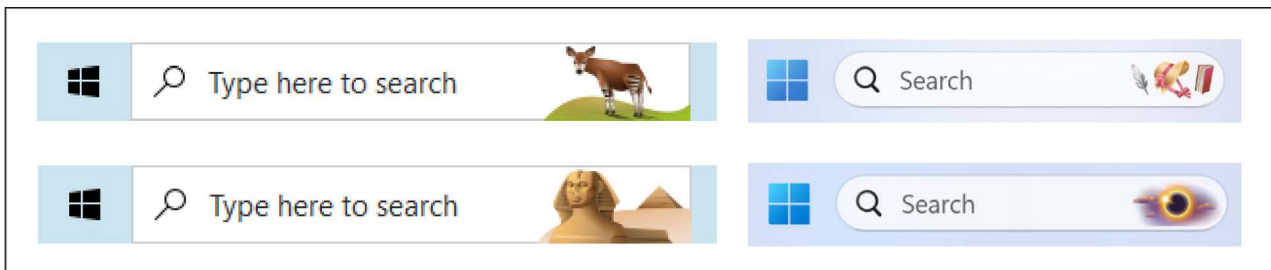


Figure 26: Search Highlights feature in Windows 10 (left) and Windows 11 (right).

The Search Highlights feature only opens links in Edge, regardless of the user's chosen default browser. It can be turned off entirely in the Settings app, but it cannot be reconfigured to open in a different browser.

Windows Widgets

Windows 11 contains a feature called Widgets. A small button in the bottom-left of the Taskbar shows a small piece of content, such as a weather forecast or stock ticker. If the user hovers over or clicks this icon (or if they press Windows+W or swipe from the left edge of the screen), the Widgets Board opens as a flyout over the desktop (figure 27).

100 Campbell, A. (2022, March 22). Group configuration: search highlights in Windows - Microsoft Community Hub. Retrieved October 22, 2023, from Windows IT Pro Blog website: <https://techcommunity.microsoft.com/t5/windows-it-pro-blog/group-configuration-search-highlights-in-windows/ba-p/3263989>

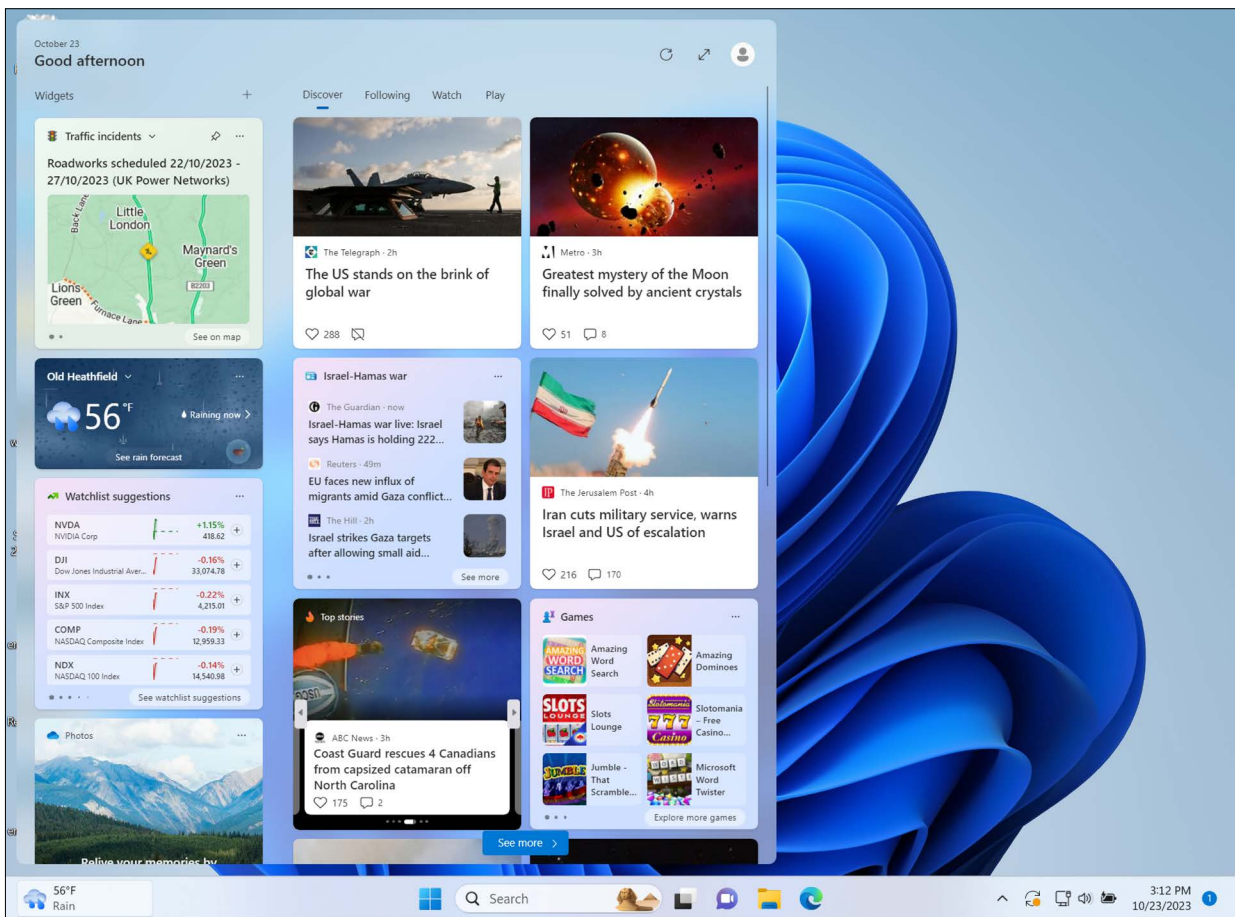


Figure 27: The Widgets Board feature in Windows 11.

Placing the Widgets icon in the corner of the desktop is a clever design decision due to Fitts's Law¹⁰¹. A trackpad or mouse user can't 'fly past' the control since the sides of the screen act as a hard edge stopping the cursor. This increases the effective size of the control. As a result, it's easy to trigger the Widgets Board, but it's also easy to trigger it by accident. If the user nudges their mouse in that direction, the cursor may end up in the bottom-left corner, hovering over the Widget icon and causing the Widgets Board to open.

The Widgets Board contains images, news articles, games and information listings, personalised according to user clicks and interactions so it can show users more of what they like¹⁰². But if a user clicks any of these appealing links, they will only open in Edge, regardless of the user's chosen default browser. No equivalent third-party product can be installed in the same position on the Taskbar. If the user wants a feature that works like Widgets, they have to use Microsoft Widgets, meaning they also have to use Edge.

101 Budiu, R. (2022, July 31). Fitts's Law and Its Applications in UX. Retrieved October 23, 2023, from Nielsen Norman Group website: <https://www.nngroup.com/articles/fitts-law/>

102 Microsoft. (n.d.). Stay up to date with widgets - Microsoft Support - Windows 11. Retrieved October 22, 2023, from <https://support.microsoft.com/en-us/windows/stay-up-to-date-with-widgets-7ba79aaa-dac6-4687-b460-ad16a06be6e4>

Outlook and Teams

In April 2023, Microsoft announced¹⁰³ 'Web links from Outlook emails or Teams chats now open in Microsoft Edge.' This change was deployed to certain groups of Windows users, specifically 'Outlook users with commercial Microsoft 365 subscriptions or Microsoft 365 Personal or Family subscriptions' (Outlook) and 'Users signed into the Microsoft Teams desktop app for Windows with their work account' (Teams).

Again this feature ignores the user's default browser choice. A user who dislikes this behaviour must then track down the appropriate setting to turn it off (Windows Settings > App and notification settings > Outlook > Automatically open Outlook email context in the side pane). We can reasonably assume some users will not find it and will feel forced to use Edge.

Copilot in Windows Preview

Copilot is a new AI assistant product that, at the time of writing (October 2023), Microsoft is currently rolling out. Since Copilot was not yet fully available in our jurisdiction, we installed a Windows Insider Preview version of Windows 11, and used that to access the 'Copilot in Windows Preview' feature¹⁰⁴. We observed this feature had the following limitations:

- The Copilot Preview chat frequently responded to questions with web links. However, these links always opened in Edge when clicked, regardless of the user's choice of default browser.
- Copilot Preview Settings contained a toggle 'Let Copilot in Windows use Microsoft Edge'. This allowed Copilot to interact with Edge, but not any other browser. For example, if we opened a long document in Edge, and gave Copilot the instruction "Please summarise the page shown in Edge", it would give a summary of the text. However, if we did the same using Firefox, it would fail to understand the instructions.

We should note these observations relate to a Preview version of Windows 11 and the Copilot in Windows Preview. The launch version may behave differently.

103 Web links from Outlook emails and Teams chats open in Microsoft Edge - Microsoft Support. (n.d.). Retrieved October 23, 2023, from Microsoft Support website: <https://support.microsoft.com/en-us/topic/web-links-from-outlook-emails-and-teams-chats-open-in-microsoft-edge-b0e1a1c1-bd62-462c-9ed5-5938b9c649f0>

104 Observed on October 26, 2023 using Windows 11 Home Insider Preview Version 22H2, Build 23570.1000, Windows Feature Experience Pack 1000.23570.1000.0 and the "Copilot in Windows Preview" app

Third-party apps and the microsoft-edge protocol

All the observations in this section – Taskbar Search, Search Highlights, Windows Widgets, Outlook and Teams, Copilot in Windows Preview – use the **Forced Action**¹⁰⁵ harmful pattern. As documented, these features or apps open links in Edge, ignoring the user’s default browser setting. It appears Microsoft has achieved this by creating a protocol `microsoft-edge://` which is used in place of standard web protocols such as `https://`. While standard web protocols respect the user’s default browser setting when opening web links, the custom `microsoft-edge://` protocol does not.

Prior to November 2021, various third-party apps including the Brave web browser¹⁰⁶ and EdgeDeflector¹⁰⁷ provided a workaround for the `microsoft-edge://` protocol, so that whenever users opened web links anywhere on their computer, including the problematic scenarios described above, these links always opened in the default browser. Mozilla planned to build a similar feature into Firefox¹⁰⁸. However, a November 2021 build of Windows 11 blocked these workarounds¹⁰⁹. In a interview in The Verge¹¹⁰ a Microsoft spokesperson went on record saying:

“Windows [...] offers certain end-to-end customer experiences in both Windows 10 and Windows 11, the search experience from the taskbar is one such example of an end-to-end experience that is not designed to be redirected. When we become aware of improper redirection, we issue a fix.”

We deem this **Forced Action** also. Users may be surprised by the inconsistent behaviour the `microsoft-edge://` protocol introduces. They may believe they’ve set a default browser to open all web links (in other words, that their chosen browser will handle all `https://` requests, even if the user doesn’t know these technical specifics), but on the occasions Microsoft uses the `microsoft-edge://` protocol, this wish will be bypassed. We cannot

105 Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Forced Action. Retrieved December 4, 2023, from <https://www.deceptive.design/types/forced-action>

106 Sampson, J. (2021, February 1). Allow Brave to Handle Searches from Windows Shell and Cortana · Issue #13875 · brave/brave-browser · GitHub. Retrieved October 23, 2023, from Github website: <https://github.com/brave/brave-browser/issues/13875>

107 Aleksandersen, D. (2021, November 10). EdgeDeflector enforces your default browser setting in Windows | Ctrl blog. Retrieved October 27, 2023, from <https://www.ctrl.blog/entry/edgedeflector-default-browser.html>

108 Kimura, M. (2021, August 19). 1726697 - Implement `microsoft-edge:` protocol handler. Retrieved October 23, 2023, from https://bugzilla.mozilla.org/show_bug.cgi?id=1726697

109 Aleksandersen, D. (2021, November 11). Windows now blocks Edge browser competitors from opening links. Retrieved December 4, 2023 from Ctrl.blog website, <https://www.ctrl.blog/entry/microsoft-edge-protocol-competition.html>

110 Warren, T. (2021, November 15). Microsoft blocks EdgeDeflector to force Windows 11 users into Edge - The Verge. Retrieved October 22, 2023, from The Verge website: <https://www.theverge.com/2021/11/15/22782802/microsoft-block-edgedeflector-windows-11>

see any valid user benefit to Microsoft using the second protocol. Its only visible function is to bypass the browser set to handle `https://` requests, and therefore to defy user choice. Even a user who has assiduously tried to use an alternative browser, following the numerous steps described under Q1 above and using software interventions to resist Microsoft's coercive design choices, will still find their OS occasionally opens Edge against their will.

06.

Impacts and conclusions

Answers to research questions

Let's revisit our proposed principles of fair browser choice (Chapter 03). To be fair to users, an OS manufacturer must let their users:

- download and install any legitimate alternative browser;
- set this browser as default; and
- use this browser on an ongoing basis,

without employing coercion, manipulation, or deception. In more practical terms, the user journeys involved should not deploy any design choices identified in our harmful design taxonomy. However, we have demonstrated that Microsoft has used harmful patterns across all three user journeys. The answers to our research questions (Chapter 04) are therefore clear:

- Q1. Downloading · Do Windows and Edge allow users to download and install a different browser without harmful interference? **No.**
- Q2. Setting · Do Windows and Edge allow users to set a different browser as their default without harmful interference? **No.**
- Q3: Respecting · Do Windows and Edge respect users' choice of default browser and allow them to continue using it without harmful interference? **No.**

In its attempts to drive Edge adoption, Microsoft is going beyond acceptable persuasion. The company is using coercion, deception, and manipulation alike.

Microsoft coerces users through its use of Forced Action in Taskbar Search and other Windows features. Additionally, the company explicitly blocked third-party workarounds in its November 2021 Windows 11 update. We find that these choices restrict users from choosing options that are in their interests, doing so in a way that makes users worse off.

Microsoft deceives users through its use of the Trick Wording pattern, seen in the Edge First Run Experience, the messages shown when a user tries to download an alternative browser, and the 'Let's finish setting up your PC' flow. We find that these designs are likely to give users a false mental model of how the relevant processes will actually work.

Recall that we have offered two potential definitions of manipulation. On the first, namely that a manipulator tries to subvert the subject's rational decision-making, we find that Microsoft manipulates its users in this way by employing the Preselection, Visual Interference, Obstruction, and Disguised Ads patterns. These are widespread across the many user journeys we researched.

Our second definition of manipulation describes it as pressure to do as the manipulator wants. Through Obstruction, Microsoft imposes additional costs – typically time and effort – on users who disobey suggestions to use Edge. Additionally, this report documents how Microsoft has deployed browser choice interventions across three products: Windows, Edge, and Bing. The cumulative effect of these many interventions means pressure on the user mounts over time.

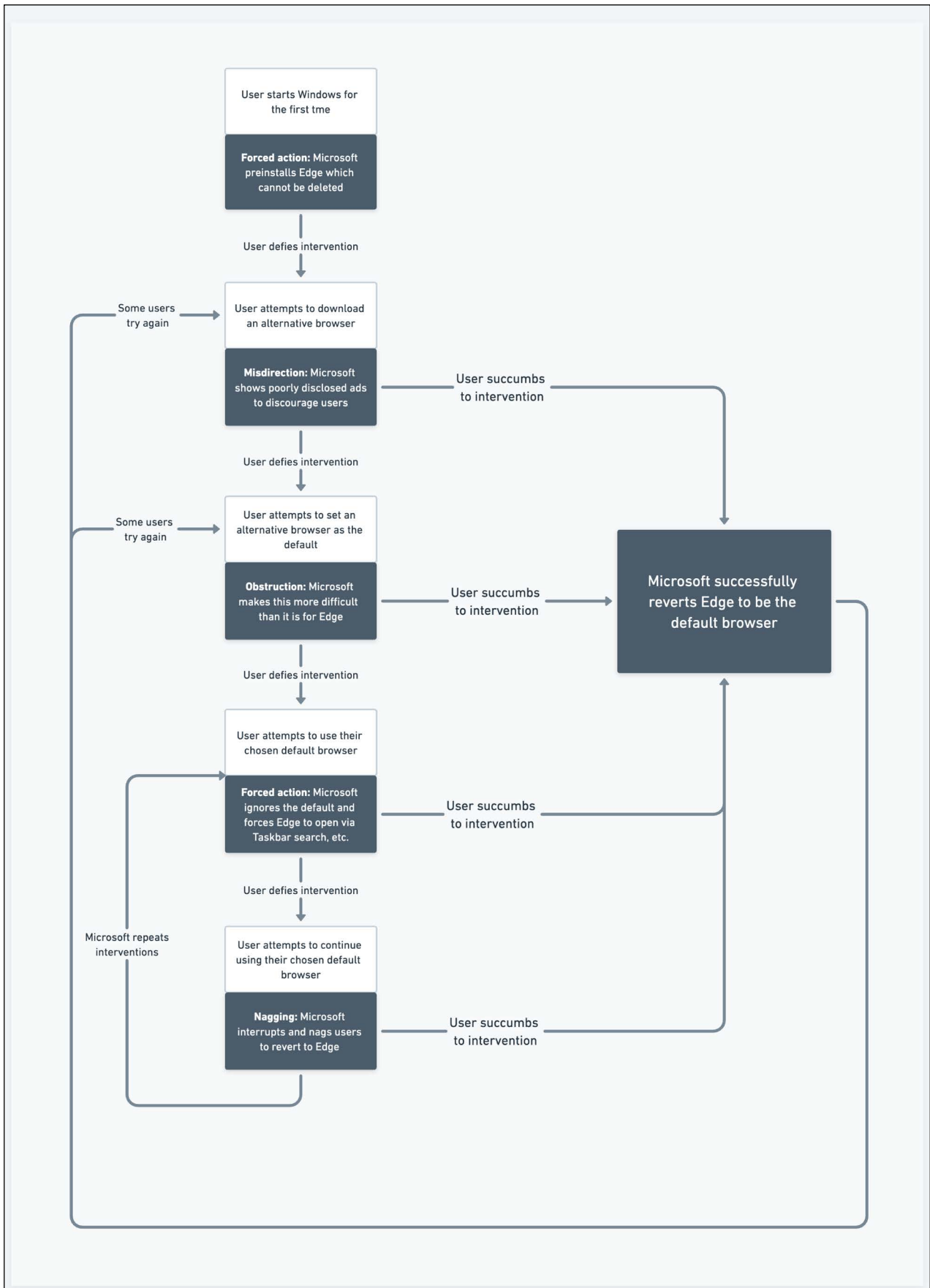


Figure 28: schematic demonstrating how Microsoft's design practices impose increasing pressure upon users.

While not every user will experience every intervention included in figure 28, the scale and prolonged duration of these interventions mean we can conclude Microsoft is running an intentional and persistent campaign to drive Edge adoption, adding further weight to the manipulation-as-pressure argument. The effect is tantamount to **Nagging**¹¹¹, a final harmful design tactic. Nagging is a well-known and effective form of manipulation, as any parent of a young child knows. To nag is to persistently hassle someone to do something they are averse to, consuming their attention and time. If the subject can't shut out the nagging or has no path for negotiation, they have only two choices: 1. suffer ongoing depletion of their time and attention, or 2. relent. Given the frequency and variety of the flows listed above, we find that Microsoft is nagging users to download and use Edge throughout their use of the Windows OS, and therefore manipulating them.

The protracted nature of the design interventions we have identified mean there is a sizable cumulative effect. When Nagging is combined with the variety of other tactics used, such as Disguised Ads, Trick Wording, and Visual Interference, the pressure to switch mounts over time. We could hardly blame a user who relented and switched to Edge simply to stop Microsoft telling him to do so.

It is easy, however, to imagine how Microsoft could avoid these harmful patterns. When the user first sets up their PC, the OS could simply ask the user which browser they'd like to use, then simply respect the user's choice¹¹².

111 Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Nagging. Retrieved December 4, 2023, from <https://www.deceptive.design/types/nagging>

112 For example, allowing users to select their browsers from a list (e.g. via a 'choice screen') is a requirement under the EU Digital Markets Act. See: BEUC. (October, 2023). Examining the Design of Choice Screens in the Context of the Digital Markets Act. Retrieved from <https://www.beuc.eu/news/new-beuc-research-dma-choice-screens-matter-give-consumers-genuine-choice-online>

Harms and impacts

Scholars, regulators, and technologists alike have investigated the potential harms that problematic design practices might cause^{113,114,115}. These typically fall into three categories: harms to consumers, harms to society, and harms to the market.

We speculate that the patterns we have identified in this report may invite the following harms:

Consumer harms

- Distortion of user choice. We believe many users, dissuaded from trying alternatives, will end up using Edge without truly knowing whether the browser is right for them.
- Inducement of nonconsensual data extraction. Some technology firms – including Microsoft – have a commercial incentive to gather personal and behavioural data about users. This data can potentially be used to train AI models, improve user experiences, or perhaps to serve targeted advertising. Trading personal data for a valuable product or service, say, is not itself a problem if the exchange is transparent and consensual. However, a user steered towards Edge, rather than selecting it independently, may not fully realise the data collection practises the browser uses. This effect will be especially pronounced if the user unwittingly gives Edge ongoing access to data – such as bookmarks or browsing history – from other browsers by, for example, leaving the ‘Bring over your data from other browsers regularly’ checkbox in Figure 3 selected. It is not our job here to analyse the privacy activities of Edge itself, but clearly a user who does not understand what is happening with their data may feel their privacy has been violated. In general, privacy violations can also invite future harms such as intrusive marketing, unjust power imbalances (e.g. an automated system that knows your persuasive weak-spots), or an erosion of dignity if, say, a company infers that you have a sensitive medical condition.
- Unwelcome intrusion. Some of the design interventions we documented interrupt other user activities. This distraction is not just an annoyance: it may mean users are less able to achieve the things they set out to achieve online.

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- 113 Mathur, A., Kshirsagar, M., and Mayer, J. (2021). What Makes a Dark Pattern... Dark? Design Attributes, Normative Considerations, and Measurement Methods. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21). Association for Computing Machinery, New York, NY, USA, Article 360, 1–18
- 114 Competition & Markets Authority (2022, April). Online Choice Architecture: How digital design can harm competition and consumers. Retrieved December 4, 2023 from https://assets.publishing.service.gov.uk/media/624c27c68fa-8f527710aaf58/Online_choice_architecture_discussion_paper.pdf
- 115 Information Commissioner's Office (2022, April). Overview of Data Protection Harms and the ICO's Taxonomy. Retrieved December 4, 2023 from <https://ico.org.uk/media/about-the-ico/documents/4020144/overview-of-data-protection-harms-and-the-ico-taxonomy-v1-202204.pdf>

- Costs of avoiding interference. If a user wishes to turn off some of these interventions, they must hunt down the appropriate setting, taking time and effort.
- Emotional distress. Harmful design practices may cause users to feel embarrassment ('I'm not good with technology'), anxiety ('Something is wrong with my system'), and an eroded sense of agency over personal tech.

Social harms

- Erosion of public trust in the technology sector. This may result from collective experience of harmful practices, press exposés, or regulatory action. It is noteworthy that public trust in technology has been diminishing for several years since the peak of the early 2010s¹¹⁶.
- Concentration of power in online information provision may introduce the potential for harms to media freedom or even democratic participation.

Market harms

- Skewing of incentives. Markets distorted by unfair and harmful practices may see competition incentives shifting away from merit (quality, product-market fit, etc) towards attributes like brand awareness. This can incentivise companies to pay less attention to serving user needs and to instead compete by means that do not directly benefit consumers.¹¹⁷
- Damage to innovation. Dominant incumbents in a market may be disincentivised from prioritising product improvements, leading to poorer customer outcomes. They may also make it harder for challengers to innovate or to reach users with innovations. This was a feature of the early web browser market itself, when Microsoft's Internet Explorer 6 dominated the market but was widely disliked by web developers due to its poor support of web standards.
- Concentration. The impact of unfair and harmful practices may mean companies cannot compete with incumbents and ultimately have to exit the market.
- Chilling effects. Potential competitors and startup challenges may be less willing to enter the market because they believe dominant players may use harmful design tactics to counter their efforts.

116 Edelman, R. (2021, March 30). 2021 Edelman Trust Barometer: Trust in Technology. Retrieved December 4, 2023 from <https://www.edelman.com/trust/2021-trust-barometer/trust-technology>

117 'When a monopolist preys on cognitive vulnerabilities, welfare erodes where, as explained in *Tucker v. Apple*, it "force[s] a purchaser to do something that he would not do in a competitive market." The harm is that users engage in behaviors against their self-interests, resulting in artificially high revenue for the monopolist, whether it be money, data, or attention.' Day, Gregory and Stemler, Abbey, *Are Dark Patterns Anticompetitive?* (October 11, 2019). *Alabama Law Review*, Vol 71:1:1, page 37

Inequality of impact

It's not possible to be vigilant for harmful design techniques every moment of our technological lives. Even the most tech-savvy person may, in a moment of fatigue or distraction, fall prey to a harmful design tactic. She then must navigate a series of troubleshooting steps:

- **Identification:** 'That's not the browser I normally use. What happened?'
- **Diagnosis:** 'Oh, it looks like the operating system default for opening web links has been changed.'
- **Solution development:** 'I'll search the web for "how to change my default browser".'
- **Implementation:** 'Right, now I've got the how-to guide, I'll follow the steps.'
- **Evaluation:** 'Okay, it looks like that worked. I can get on with my day.'

This process is far from trivial, and may be too difficult for some users to follow. Many people find day-to-day informational and digital tasks difficult. A 2013 study¹¹⁸ found that:

- 30% of US adults are likely to have difficulty sorting through emails and organising them in folders provided for them.
- 20% of US adults are unlikely to find the name of a congressperson with a summary information sheet that lists the district, name, year and place of birth.
- 30% of US adults are unlikely to be able to calculate the total cost of daily car rental when provided with miles driven that day, cost per day and cost per mile.
- 16% of US adults are digitally illiterate, and cannot use a computer to find a recipe, make a retail purchase or file taxes online.

People with low literacy, numeracy, and problem-solving proficiencies are particularly vulnerable to exploitation online, since the medium makes heavy demands of these skills. These cohorts then have no choice but to trust the businesses that make their software and their governments to enact regulations and safeguards that protect citizens. When this trust is broken, the harms of harmful design will fall hardest on those who are already vulnerable¹¹⁹. This regrettable outcome should increase our collective distaste for harmful design techniques.

118 Infographics. (n.d.). PIAAC Gateway. Retrieved 24 January 2023 from <https://www.piaacgateway.com/infographics>.

119 See, for example, Competition & Markets Authority (2019, February). Consumer vulnerability: challenge and potential solutions. Retrieved December 4, 2023 from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/782542/CMA-Vulnerable_People_Accessible.pdf

Are Microsoft's choices defensible?

Microsoft may argue it can justify the harmful design practices we've identified. Below we analyse four possible defences. In our view, none are valid.

Chrome users appear unhindered

Google Chrome has been the dominant desktop browser for many years, when aggregated across all major OSs globally (figure 29). By comparison, Edge is a relatively minor player. Since Windows is still the dominant OS, it is clear that millions of Windows users have overcome the practices we've questioned to successfully download and use Chrome. Microsoft may therefore argue these practices don't unfairly skew the browser market or user choice.

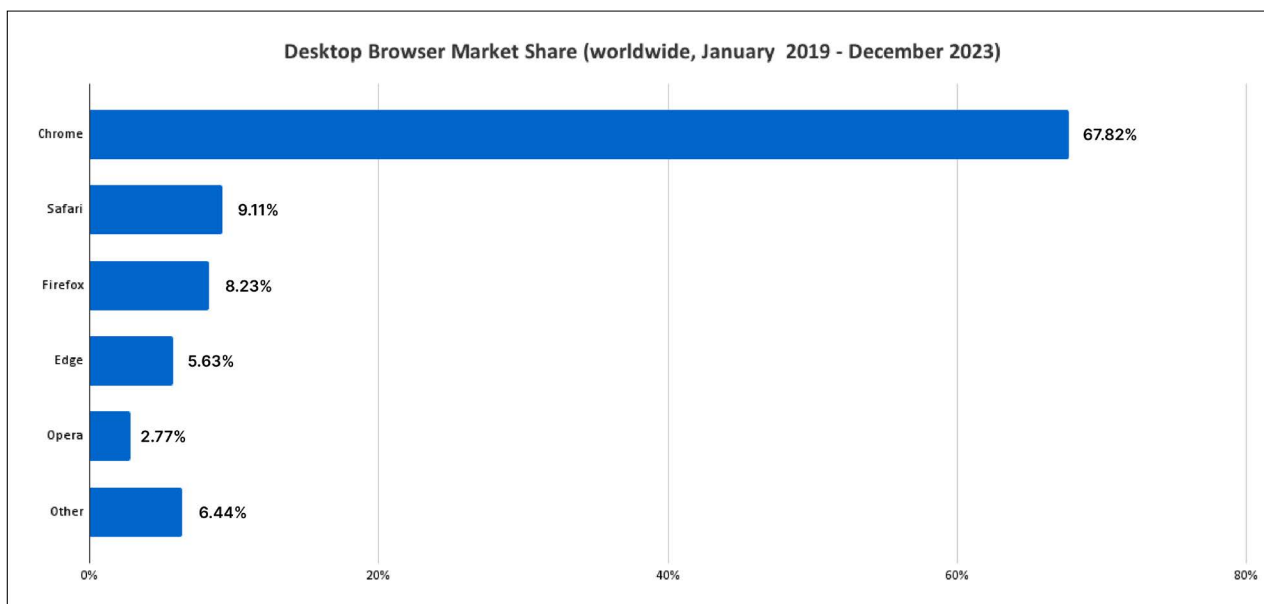


Figure 29: Desktop browser market share worldwide Jan 2019 - Oct 2023 ¹²⁰

This defence is to an extent self-defeating, since its central claim is that the design techniques Microsoft uses are ineffective. If this were so, Microsoft would have no reason to use them and should abandon them.

Of course, harmful design patterns are effective, as we will discuss later. This is why companies use them. Their primary effect on markets is to skew competition from merit to other attributes such as brand (see Market harms above). We can think of harmful patterns as providing headwinds for competition: powerful players can push through these headwinds,

120 Source: <https://gs.statcounter.com/browser-market-share/desktop/worldwide/#monthly-201901-202310-bar>. Note that there may be shortcomings in Statcounter data, such as its scripts being blocked by tracking protections that some browsers deploy.

but others cannot. Chrome has massive brand awareness and marketing spend – its logo was emblazoned on a 2023 Formula One car, as an example – and Google benefits from its wide range of products including Android, Gmail, Google Maps, Google Calendar, Google Drive, others that offer a large surface area through which Google can promote installation and use of Chrome.

Smaller browser manufacturers, lacking these advantages, are less able to defend against the destabilising effects of harmful design. It does not follow that harmful design that has only modest effects against a tech giant will therefore have only modest effects against a smaller competitor. Although Edge hasn't toppled Chrome's dominance, it seems plausible that it has earned market share by enticing users over from every competitor, potentially hitting smaller vendors harder.

As external researchers, we can never know for sure exactly how Microsoft's interventions have affected the market share of Edge and other browsers. Other browser vendors who decline to track user behaviour are also unlikely to have a clear picture. Microsoft themselves are likely to have the most accurate view since they would benefit from Windows data in addition to Edge and Bing. It is also likely that Microsoft has tracked the impact of specific interventions, since this is standard practice for analytics and A/B testing within large tech firms.

Note that many of the harmful patterns we have identified are not found within Edge itself: they are design patterns within Windows. This weakens the defence that Edge is a minor player in the browser market. The point is hardly relevant to harmful practices that are mostly not found within Edge but within a dominant OS. We might even argue it is hard to untangle Windows and Edge as independent products: given how intertwined Windows and Edge are in practice, it is hard to see how Microsoft can argue the two user bases are independent. It seems likely, therefore, that harmful practices in one will have strong effects in the other. This strengthens a potential claim that Microsoft is misusing its market power to unfairly steer people towards Edge.

Additionally, we note that Edge's market share is far higher on Windows than on other platforms¹²¹ such as macOS. This further strengthens the case that Microsoft's platform advantage and harmful design practices have had a sizable effect on Edge adoption. We do not necessarily claim Microsoft is alone in using these tactics: whether other OS and browser makers apply similar harmful design patterns is outside our research scope.

121 Source: <https://radar.cloudflare.com/reports/browser-market-share-2023-q2>. To replicate, scroll to Market Share by OS, and filter by OS.

‘We don’t do that any more.’

Microsoft may point out many of the examples we’ve highlighted come from Windows 10, and argue that their equivalents in Windows 11 are fair. To further support this point, Microsoft may point to public statements such as its ‘Principled approach to app pinning and app defaults.’¹²²

We would welcome positive change, while cautioning that no company deserves effusive praise for merely reducing previous wrongdoing. But our findings show Windows 11 still contains many harmful design patterns. Furthermore, Microsoft cannot credibly claim it has abandoned harmful design practices when recent Microsoft products and features still unjustifiably skew users towards Edge, such as the Copilot in Windows Preview, Windows Widgets, and Search Highlights patterns described in Chapter 05.

We might also question the motivations behind any claimed change of heart. If Windows 11 were indeed to use fewer harmful design patterns than Windows 10, would that be because Microsoft wants to treat its customers more fairly, or because of fear of regulatory action? Certainly it appears that new European legislation has driven at least one change, namely allowing other search providers into Taskbar Search (Chapter 05, Q3). An ethical decision made solely to avoid punishment is not an ethical decision.

But the largest flaw in this defence is evident when we examine current install bases. Windows 10 is still the world’s most popular desktop OS by some distance, with a user base roughly three times that of Windows 11¹²³. While Windows 10 remains dominant, hundreds of millions of users are exposed to the harmful influence of Microsoft’s design practices¹²⁴. It is not enough to argue that users will be treated more fairly if they upgrade to Windows 11. If Microsoft were truly concerned about this issue they could simply ship the fairer interfaces into Windows 10 using an OS update.

122 Roth, T. and Grady, A. (2023, March 17). A principled approach to app pinning and app defaults in Windows. Retrieved December 4, 2023 from <https://blogs.windows.com/windowsexperience/2023/03/17/a-principled-approach-to-app-pinning-and-app-defaults-in-windows>

123 Desktop Windows Version Market Share Worldwide Jan 2009 - Oct 2023 | Statcounter Global Stats. (n.d.). Retrieved October 24, 2023, from Statcounter website: <https://gs.statcounter.com/windows-version-market-share/desktop/worldwide/#yearly-2022-2023-bar>

124 Per Microsoft’s 2022 shareholder letter, there are 1.4 billion active devices running Windows 10 or 11. Microsoft. (2022). Annual Report 2022. Retrieved December 4, 2023 from <https://www.microsoft.com/investor/reports/ar22/index.html#>

Competition leaves no choice but to use harmful design

A more robust defence is that harmful design creates competitive advantage, meaning a company that declines to use them will fall behind competitors that do. This is at least partially true.

Studies show that harmful designs can be highly effective. The Chilean Consumer Protection Agency, SERNAC, found that switching a default button in a cookie banner (a Preselection pattern) changed cookie rejection rates from 67.2% to 5.5%¹²⁵. Meanwhile, researchers at ticket marketplace Stubhub compared two alternative designs in a study involving several million users¹²⁶. In one variant users saw the full ticket cost, including additional fees, up front. In the second design, additional fees were revealed only right before payment, a pattern known as Hidden Costs¹²⁷ (aka drip pricing¹²⁸). The Hidden Costs condition was shockingly effective: users spent around 21% more and were 14% more likely to complete a purchase.

Having not analysed the design practices of Microsoft's competitors, we can't comment on whether they also deploy harmful designs. If they do, Microsoft would indeed be at a competitive disadvantage if it didn't use harmful design tactics too. Even so, this wouldn't excuse their use.

First, effectiveness doesn't excuse wrongful acts: if anything, it makes them even less acceptable. The striking power of deceptive design patterns is all the more reason to protect users from the harms described above. Secondly, other people's bad behaviour doesn't excuse your own. Microsoft alone must choose whether it wants to coerce, manipulate, or deceive its users, and accept the consequences if it does. This would be particularly true if the practices involved were unlawful. With regulators increasingly challenging harmful or deceptive patterns and lawmakers passing new regulation, an appeal to competitors' transgressions is scant defence.

Finally, the competition defence suggests the only solution is a race to the bottom, with each competitor deploying more exploitative and damaging practices to extract more com-

125 Servicio Nacional del Consumidor [SERNAC]. (2022, March). Policy paper on cookies consent requests: Experimental evidence of privacy by default and dark patterns on consumer privacy decision making. Retrieved 28 January 2023 from https://icpen.org/sites/default/files/2022-05/SERNAC_Policy_Paper_Cookies_Experiment.pdf

126 Blake, T., Moshary, S., Sweeney, K., & Tadelis, S. (2021). Price Salience and Product Choice. *Marketing Science*, 40(4), 619–636. <https://doi.org/10.1287/mksc.2020.1261>

127 Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Hidden Costs. Retrieved December 4, 2023, from <https://www.deceptive.design/types/hidden-costs>

128 Federal Trade Commission. The economics of drip pricing. (2015, January 6). Retrieved 10 October 2022 from <https://www.ftc.gov/news-events/events/2012/05/economics-drip-pricing>

mercial value from users. This would be a dreadful outcome for the technology sector, particularly in light of its recent crisis of user trust. The competition defence is incompatible with a world of respectful technology.

Some interventions will merely persuade

In practice, design interventions typically influence users in multiple ways at once. An info box on an e-commerce product page may list the product's features, allowing for rational comparison of benefits, while also using a Fake Scarcity pattern¹²⁹ to make the user think they have to act fast.

This means it can be hard to know which techniques will actually affect a particular user. Some people will doubtless be persuaded by the fair techniques. Others will be influenced by the problematic ones. In other words, not everyone will be manipulated, coerced, or deceived even by a 'harmful design'. Some Windows users may notice and understand all the patterns we've observed, correctly interpreting that Microsoft is trying to influence them by both rational and manipulative means, and not only be fine with this, but also use this information to make a rational decision as a result.

This defence then argues that harmful tactics won't harm everyone. True. But it does not follow that, for example, since a design won't manipulate every user, the design is not manipulative. In our expert judgement the patterns we've observed fall into known categories of problematic design documented by other authorities in the field. All meet the conditions of coercion, manipulation, or deception outlined in Chapter 02. This is enough to label them harmful.

129 Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). Deceptive Patterns - Types - Fake scarcity. Retrieved December 4, 2023, from <https://www.deceptive.design/types/fake-scarcity>

Conclusions

We have found that Microsoft uses a number of harmful designs to influence users into using the Edge browser. In our view, these designs coerce, manipulate, or deceive users and are therefore unjustifiable, with the potential to cause a variety of consumer, society, and market harms. Microsoft should stop using these techniques immediately.

This should not prove difficult. Since these patterns are now well documented, a competent designer or product manager can recognise when their company is tempted to use them, and use this documentation to resist this choice. We recommend the taxonomies from Brignull et al., Mathur et al., or Gray et al. to anyone who wants to identify harmful design patterns in their own work.

Stopping the use of these patterns might weaken Microsoft's ability to push users to Edge in the short term. However, it would help to position Microsoft as a fairer actor in the browser and OS space. Any short-term conversion hit would, in our view, be adequately compensated by a long-term benefit: a restored mutual trust and respect between the company and its users. Studies show that consumers today wish for companies to act responsibly and ethically, and stay loyal to those that do¹³⁰. It is time for Microsoft to heed these trends.

Where Microsoft, or indeed any other company, cannot self-regulate and stop using harmful design techniques, regulators and lawmakers should step up to protect users, societies, and markets from the harms that might result. However, as long as dominant players continue to use these tactics, the browser market – and end users – will ultimately suffer.

130 Salesforce Research (n.d.). Special Report: Ethical Leadership and Business. Retrieved December 4, 2023 from https://www.salesforce.com/content/dam/web/en_us/www/documents/research/salesforce-research-ethical-leadership-and-business.pdf

Appendix:

Taxonomy of harmful design patterns

For details on each pattern, including definitions, examples, references, and related laws and cases, see Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). Deceptive patterns – user interfaces designed to trick you. <https://www.deceptive.design/>. Similar patterns are identified by Mathur et al.¹³¹ and Gray et al¹³².

Comparison prevention · The user struggles to compare products because features and prices are combined in a complex manner, or because essential information is hard to find.

Confirmshaming · The user is emotionally manipulated into doing something that they would not otherwise have done.

Disguised ads · The user mistakenly believes they are clicking on an interface element or native content, but it's actually a disguised advertisement.

Fake scarcity · The user is pressured into completing an action because they are presented with a fake indication of limited supply or popularity.

Fake social proof · The user is misled into believing a product is more popular or credible than it really is, because they were shown fake reviews, testimonials, or activity messages.

Fake urgency · The user is pressured into completing an action because they are presented with a fake time limitation.

Forced action · The user wants to do something, but they are required to do something else undesirable in return.

Hard to cancel · The user finds it easy to sign up or subscribe, but when they want to cancel they find it very hard.

131 Mathur, A., Acar, G., Friedman, M., Lucherini, E., Mayer, J., Chetty, M., & Narayanan, A. (2019). Dark Patterns at Scale: Findings from a Crawl of 11K Shopping Websites. *Proceedings of the ACM on Human-Computer Interaction*, 3(CSCW), 1–32

132 Gray, C., Kou, Y., Battles, B., Hoggatt, J., and Toombs, A. L. (2018). The Dark (Patterns) Side of UX Design. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. Association for Computing Machinery, New York, NY, USA, Paper 534, 1–14

Hidden costs · The user is enticed with a low advertised price. After investing time and effort, they discover unexpected fees and charges when they reach the checkout.

Hidden subscription · The user is unknowingly enrolled in a recurring subscription or payment plan without clear disclosure or their explicit consent.

Nagging · The user tries to do something, but they are persistently interrupted by requests to do something else that may not be in their best interests.

Obstruction · The user is faced with barriers or hurdles, making it hard for them to complete their task or access information.

Preselection · The user is presented with a default option that has already been selected for them, in order to influence their decision-making.

Sneaking · The user is drawn into a transaction on false pretences, because pertinent information is hidden or delayed from being presented to them.

Trick wording · The user is misled into taking an action, due to the presentation of confusing or misleading language.

Visual interference · The user expects to see information presented in a clear and predictable way on the page, but it is hidden, obscured or disguised.

