

# Google the Gatekeeper: How Search Components Affect Clicks and Attention

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Northeastern University



# Background: Evolution of Google Search

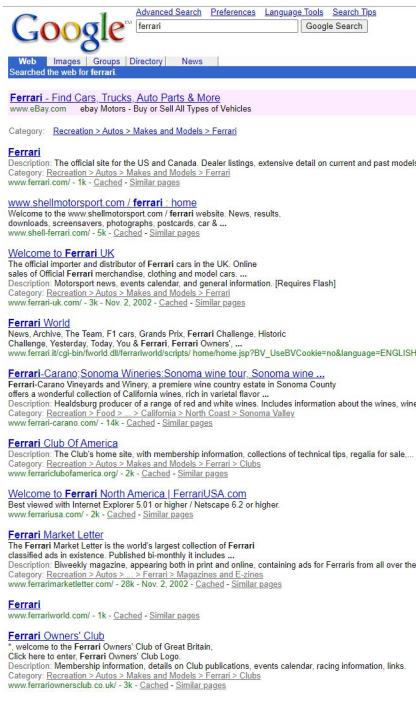
## 1998: 10 Blue Links

The screenshot shows the first page of Google search results for the query "ferrari". The results are displayed in a table format with columns for Title, Description, and URL.

Title	Description	URL
<a href="#">Ferrari - Find Cars, Trucks, Auto Parts &amp; More</a>	www.eBay.com - ebay Motors - Buy or Sell All Types of Vehicles	www.eBay.com
<a href="#">Category: Recreation &gt; Autos &gt; Makes and Models &gt; Ferrari</a>		
<a href="#">Ferrari</a>	Description: The official site for the US and Canada Dealer listings, extensive detail on current and past models. Category: Recreation > Autos > Makes and Models > Ferrari www.ferrari.com - 1k - Cached - Similar pages	www.ferrari.com
<a href="#">www.shelldriversport.com / ferrari / home</a>	Welcome to the www.shelldriversport.com / Ferrari website. News, results, downloads, screensavers, photographs, postcards, car & ... www.shelldriversport.com - 5k - Cached - Similar pages	www.shelldriversport.com
<a href="#">Welcome to Ferrari UK</a>	The official importer and distributor of Ferrari cars in the UK. Online sales of Official Ferrari merchandise, clothing and model cars ... Description: Motorsport news, events calendar, and general information. [Requires Flash] Category: Recreation > Autos > Makes and Models > Ferrari www.ferrariuk.com - 3k - Nov. 2, 2002 - Cached - Similar pages	www.ferrariuk.com
<a href="#">Ferrari World</a>	News, Archive, Team, F1 cars, Grand Prix, Ferrari Challenge, Historic Challenge, Yesterday, Today, You & Ferrari, Ferrari Owners, ... www.ferrari.it/cgi-bin/world/diferrariworld/scripts/home/home.jsp?BV_UseBVCookie=no&language=ENGLISH -	www.ferrari.it/cgi-bin/world/diferrariworld/scripts/home/home.jsp
<a href="#">Ferrari-Carano Sonoma Wineries Sonoma wine tour_Sonoma wine</a>	Ferrari-Carano Vineyards and Winery, a premiere wine country estate in Sonoma County offers a wonderful collection of California wines, rich in varietal flavor! ... Description: Healdsburg producer of a range of red and white wines. Includes information about the wines, winery Category: Recreation > Autos > Makes and Models > Ferrari > North Coast > Sonoma Valley www.ferrari-carano.com - 14k - Cached - Similar pages	www.ferrari-carano.com
<a href="#">Ferrari Club Of America</a>	Description: The Club's home site, with membership information, collections of technical tips, regalia for sale, ... Category: Recreation > Autos > Makes and Models > Ferrari > Clubs www.ferrariclubofamerica.org - 2k - Cached - Similar pages	www.ferrariclubofamerica.org
<a href="#">Welcome to Ferrari North America   FerrariUSA.com</a>	Best viewed with Internet Explorer 5.0 or higher / Netscape 6.2 or higher www.ferrariusa.com - 2k - Cached - Similar pages	www.ferrariusa.com
<a href="#">Ferrari Market Letter</a>	The Ferrari Market Letter is the world's largest collection of Ferrari classified ads as it exists. Published monthly, it includes ... Description: A monthly magazine, appearing both in print and online, containing ads for Ferraris from all over the world Category: Recreation > Autos > Ferrari > Magazines and E-zines www.ferrarimarketletter.com - 28k - Nov. 2, 2002 - Cached - Similar pages	www.ferrarimarketletter.com
<a href="#">Ferrari</a>	www.ferrariworld.com - 1k - Cached - Similar pages	www.ferrariworld.com
<a href="#">Ferrari Owners' Club</a>	... welcome to the Ferrari Owners' Club of Great Britain. Click here to enter. Ferrari Owners' Club Logo Description: Membership information, details of Club publications, events calendar, racing information, links. Category: Recreation > Autos > Makes and Models > Ferrari > Clubs www.ferrariownersclub.co.uk - 3k - Cached - Similar pages	www.ferrariownersclub.co.uk

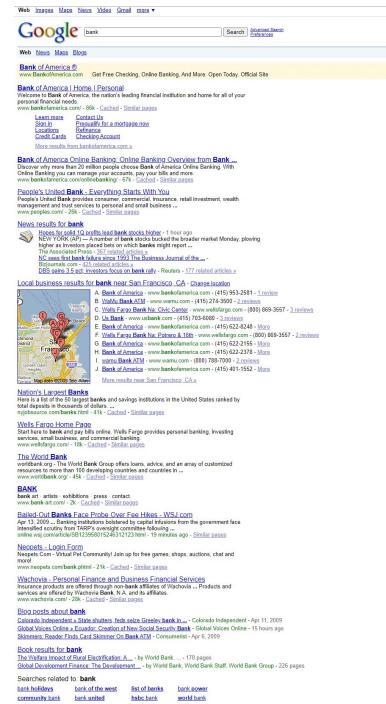
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## 1998: 10 Blue Links

A screenshot of a Google search results page from 1998. The search term 'ferrari' is entered in the search bar. The results are displayed in a grid format with 10 blue links. The links include:

- Ferrari - Find Cars, Trucks, Auto Parts & More
- www.eBay.com - eBay Motors - Buy or Sell All Types of Vehicles
- Category: Recreation > Autos > Makes and Models > Ferrari
- Description: The official site for the US and Canada Dealer listings, extensive detail on current and past models.
- Category: Recreation > Autos > Makes and Models > Ferrari
- www.ferrari.com - 1k - Cached - Similar pages
- Welcome to the www.shellmotorsport.com / ferrari website. News, results, downloads, screensavers, photographs, postcards, car ...
- www.shell-ferrari.com - 5k - Cached - Similar pages
- Welcome to Ferrari UK
- The official importer and distributor of Ferrari cars in the UK. Online sales of Official Ferrari merchandise, clothing and model cars ...
- Description: Motorsport news, events calendar and general information. [Requires Flash]
- Category: Recreation > Autos > Makes and Models > Ferrari
- www.ferrari-uk.com - 3k - Nov. 2, 2002 - Cached - Similar pages
- Ferrari World
- News, Archive, Team, F1 cars, Grand Prix, Ferrari Challenge, Historic, Challenge, Yesterday, Today, You & Ferrari, Ferrari Owners, ...
- www.ferrari.it/cgi-bin/world/ferrariworld/scritta/home/home.jsp?BV\_UseBVCookie=no&language=ENGLISH -
- Ferrari-Carano Sonoma Wineries Sonoma wine tour, Sonoma wine, ...
- Ferrari-Carano Vineyards and Winery, a premiere wine country estate in Sonoma County offers a wonderful collection of California wines, rich in varietal flavor! ...
- Description: Healdsburg producer of a range of red and white wines. Includes information about the wines, winery, Cellars, Events, and more.
- Category: Recreation > Autos > Ferrari > North Coast > Sonoma Valley
- www.ferrari-carano.com - 14k - Cached - Similar pages
- Welcome to Ferrari North America | FerrariUSA.com
- Best viewed with Internet Explorer 5.01 or higher / Netscape 6.2 or higher
- www.ferrariusa.com - 2k - Cached - Similar pages
- Ferrari Market Letter
- The Ferrari Market Letter is the world's largest collection of Ferrari classified ads as it exists today. Published monthly it includes:
- Description: Classified ads magazine appearing both in print and online, containing ads for Ferraris from all over the world.
- Category: Recreation > Autos > Ferrari > Magazines and E-zines
- www.ferrarmarketletter.com - 28k - Nov. 2, 2002 - Cached - Similar pages
- Ferrari
- www.ferrariworld.com/ - 1k - Cached - Similar pages
- Ferrari Owners Club
- welcome to the Ferrari Owners' Club Great Britain.
- Click here to enter: Ferrari Owners' Club Logo
- Description: Membership information, details on Club publications, events calendar, racing information, links.
- Category: Recreation > Autos > Makes and Models > Ferrari > Clubs
- www.ferrariownersclub.co.uk/ - 3k - Cached - Similar pages

## 2007: Universal Search

A screenshot of a Google search results page from 2007. The search term 'ferrari' is entered in the search bar. The results are displayed in a grid format with 10 blue links. The links include:

- Bank of America
- Get Free Checking, Online Banking, And More. Open Today. Official Site
- www.BankofAmerica.com
- Bank of America Home | Personal
- Bank of America, the nation's leading financial institution and home for all of your personal financial needs.
- Bank of America - Online Banking Overview
- Learn more Contact us
- Locate a branch or mortgage info
- Locate a branch or mortgage info
- More results from bankofamerica.com
- Bank of America Online Banking, Online Banking Overview from Bank ...
- Discover why more than 20 million people choose Bank of America Online Banking. With more than 100 years of experience, Bank of America Online Banking is the easiest way to manage your money.
- www.BankofAmerica.com - 47k - Cached - Similar pages
- People's United Bank
- People's United Bank provides consumer, commercial, insurance, retail investment, wealth management, and trust services to individuals and businesses ...
- www.peoples.com/ - 28k - Cached - Similar pages
- News results for Bank
- New York City's profits and bank stocks higher - 1 hour ago
- NEW YORK (AP) — Another 14 bank stocks ticked the broader market Monday, pushing
- The Associated Press - 327 related articles
- Bank of America's stock rises after earnings report - 1 hour ago
- CBS News - 33 related articles
- More results from bank.com
- Local business results for bank near San Francisco, CA - Change location
- A. Bank of America - www.bankofamerica.com - (415) 453-2541 - 1 review
- B. Wells Fargo Bank - www.wellsfargo.com - (800) 869-3567 - 3 reviews
- C. Wells Fargo Bank Nt. Civic Center - www.wellsfargo.com - (888) 869-3567 - 3 reviews
- D. Chase - www.chase.com - (800) 227-4691 - 1 review
- E. U.S. Bank - www.usbank.com - (415) 823-0248 - 1 review
- F. Wells Fargo Bank Nt. Petaluma & 1st - www.wellsfargo.com - (800) 869-3567 - 1 review
- G. Bank of America - www.bankofamerica.com - (800) 869-3567 - 1 review
- H. Bank of America - www.bankofamerica.com - (415) 453-2576 - 1 review
- I. Bank of America - www.bankofamerica.com - (800) 769-7059 - 2 reviews
- J. Bank of America - www.bankofamerica.com - (415) 453-1562 - 1 review
- More results near San Francisco, CA
- Nation's Largest Banks
- Bank of America, JPMorgan Chase and Bank of America are the top three largest banks and savings institutions in the United States ranked by total assets in thousands of dollars ...
- www.banks.com - 10k - Cached - Similar pages
- Wells Fargo Home Page
- Start to bank and pay bills online. Wells Fargo provides personal banking, investing services, and other financial products and services.
- www.wellsfargo.com/ - 18k - Cached - Similar pages
- The World Bank
- International Bank for Reconstruction and Development offers loans, advice, and an array of customized resources to more than 100 developing countries and countries ...
- www.worldbank.org/ - 10k - Cached - Similar pages
- BANK
- Bank news, videos, exhibitions, press contact
- www.Bank-at-work.com/ - 2k - Cached - Similar pages
- Bank Out! Banks Face Probe Over Fed Help - WSJ.com
- For the first time, the Federal Reserve has taken action against a bank from the government face intended solely from TARP's oversight committee following
- reducing its lending to small business and consumers. - 1 hours ago - Similar pages
- NewsNet - Login Form
- NewsNet - Virtual newsroom. Log in for free press, ships, auctions, chat and more newsroom features.
- www.newsnet.com/ - 25k - Cached - Similar pages
- World - Principal Finance and Banking Group Services
- Insurance products are offered through bank offices of Wachovia... Products and services are provided by Wachovia and its affiliated companies.
- www.wachovia.com/ - 20k - Cached - Similar pages
- Blog posts about Bank
- Colorado Independent photo: Indebted Credit bank in ... - Colorado Independent - Apr 11, 2009
- Global Voices Online - Cruiser: Creation of New Social Security Dept - Global Voices Online - 15 hours ago
- Skinner's Roads to Riches Card Summary On Bank FM - Consumer - Apr 8, 2009
- Books About Banks
- The Inhibitance Impact of Rural Electrification A ... - by World Bank, ... - 175 pages
- Development Finance, The Development ... - by World Bank, World Bank Staff, World Bank Group - 226 pages
- Searches related to bank
- Bank of America - 1 of the world's best banks bank power
- community bank bank united bank bank world bank

# Background: Evolution of Google Search

## 1998: 10 Blue Links

Google Advanced Search Preferences Language Tools Search This Web Images Groups Directory News Searched the web for Ferrari

**Ferrari - Find Cars, Trucks, Auto Parts & More**  
www.eBay.com eBay Motors - Buy or Sell All Types of Vehicles

Category: Recreation > Autos > Makes and Models > Ferrari

**Ferrari**  
Description: The official site for the US and Canada Dealer listings, extensive detail on current and past models.

Category: Recreation > Autos > Makes and Models > Ferrari  
www.ferrari.com - 1k - Cached - Similar pages

**www.shelmotsport.com / ferrari - home**  
Welcome to the www.shelmotsport.com / Ferrari website. News, results, downloads, screensavers, photographs, postcards, car ...  
www.shel-ferrari.com - 5k - Cached - Similar pages

**Welcome to Ferrari UK**  
The official importer and distributor of Ferrari cars in the UK. Online sales of Official Ferrari merchandise, clothing and model cars ...  
Description: Motorsport news, events calendar and general information. [Requires Flash]  
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www.ferrari-uk.com - 3k - Nov. 2, 2002 - Cached - Similar pages

**Ferrari World**  
News, Archive, Events, Team, F1 cars, Grand Prix, Ferrari Challenge, Historic, Challenge, Yesterday, Today, You & Ferrari, Ferrari Owners, ...  
www.ferrari.it/cgi-bin/world/ferrariworld/scritps/home/home.jsp?BV\_UseBVCookie=no&language=ENGLISH -

**Ferrari-Carano Sonoma Wineries Sonoma wine tour, Sonoma wine**  
Ferrari-Carano Vineyards and Winery, a premiere wine country estate from California offers a wonderful collection of California wines, rich in varietal flavor! ...  
Description: Healdsburg producer of a range of red and white wines. Includes information about the wines, winery, Cellars, Events, and more.  
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**Ferrari Club of America**  
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**Welcome to Ferrari North America | FerrariUSA.com**  
Best viewed with Internet Explorer 5.01 or higher / Netscape 6.2 or higher  
www.ferrarusacom - 2k - Cached - Similar pages

**Ferrari Market Letter**  
The Ferrari Market Letter is the world's largest collection of Ferrari classified ads as published in publications all around the world. ...  
Description: Classified ads magazine, appearing both in print and online, containing ads for Ferraris from all over the world.  
Category: Recreation > Autos > Ferrari > Magazines and E-zines  
www.ferrarmarketletter.com - 28k - Nov. 2, 2002 - Cached - Similar pages

**Ferrari**  
www.ferrariworld.com/ - 1k - Cached - Similar pages

**Ferrari Owners' Club**  
... welcome to the Ferrari Owners' Club of Great Britain. Click here to enter. Ferrari Owners' Club Logo  
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Category: Recreation > Autos > Makes and Models > Ferrari > Clubs  
www.ferrariownersclub.co.uk/ - 3k - Cached - Similar pages

## 2007: Universal Search 2012: Knowledge Graph

Google Bank Advanced Search Preferences Language Tools Search This Web Images Maps News Video Gmail mass \* Searched the web for Taj Mahal

**Taj Mahal - Wikipedia, the free encyclopedia**  
The Taj Mahal is a white marble mausoleum located in Agra, India. It was built by Mughal Emperor Shah Jahan as a tomb for his wife Mumtaz Mahal. It is considered one of the greatest architectural achievements of India. ...  
Category: Reference > Encyclopedia > Wikipedia > Taj Mahal

**Taj Mahal (mausoleum) - Wikipedia, the free encyclopedia**  
The Taj Mahal is a white marble mausoleum located in Agra, India. It was built by Mughal Emperor Shah Jahan as a tomb for his wife Mumtaz Mahal. It is considered one of the greatest architectural achievements of India. ...  
Category: Reference > Encyclopedia > Wikipedia > Taj Mahal

**Taj Mahal**  
The Taj Mahal is a white marble mausoleum located in Agra, India. It was built by Mughal Emperor Shah Jahan as a tomb for his wife Mumtaz Mahal. It is considered one of the greatest architectural achievements of India. ...  
Category: Reference > Encyclopedia > Wikipedia > Taj Mahal

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# 1998: 10 Blue Links

## 2007: Universal Search   2012: Knowledge Graph

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About 16,400,000 results (0.45 seconds)

**Taj Mahal - Wikipedia, the free encyclopedia**  
[View page](#) [Edit page](#) [Talk](#) [History](#) [Edit](#) [Print](#) [Cite](#) [View source](#) [View history](#)  
The Taj Mahal is a white marble mausoleum located in Agra, India. It was built by Mughal Emperor Shah Jahan in memory of his wife Mumtaz Mahal.  
→ Origins and architecture of the ... [Mughal architecture](#) [Shah Jahan](#) [Agra](#)

**Taj Mahal (monument) - Wikipedia, the free encyclopedia**  
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The Taj Mahal, also known as the Taj Mahal or Taj Mahal, was completed in May 1643, which includes the stage name Taj Mahal, is an American Grammy Award winning blues musician. He incorporates ...

**Atlantic City New Jersey Casino Hotels | Taj Mahal, Atlantic City**  
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For five star Atlantic City Casino hotels, the Taj Mahal Casino Hotel offers restaurants, roulette and a casino floor that can't resist. Explore our Atlantic City ...

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★★★★★ 282 Google reviews · Write a review  
Symbol of Justice Judgment BH 62 282001 Agra, Uttar Pradesh, India  
Phone: 0562 222 6431

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Official site featuring information about the Taj Mahal, its history, architecture, ...

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About 1,690,000,000 results

**Any time**  
**Past hour**  
**Past week**  
**Past month**  
**Past year**

**All results**  
**Verbatim**

**Marketing** is a form of communication between you and your customers with the goal of selling your product or service to them. Communicating the value of your product or service is a key aspect of **marketing**.

**Marketing News & Topics - Entrepreneur**  
[www.entrepreneur.com/topic/marketing](http://www.entrepreneur.com/topic/marketing)

**Business development** is the process of marketing, sales, and development strategies for your company. [www.entrepreneur.com/explore/business-development](http://www.entrepreneur.com/explore/business-development)

**Business Networking** is a fast and low cost method of marketing that is used to build new business contacts through connecting with other like minded individuals. [www.entrepreneur.com/explore/business-networking](http://www.entrepreneur.com/explore/business-networking)

**Marketing strategies** serve as the fundamental underpinning of marketing plans designed to increase sales and reach marketing objectives. [www.entrepreneur.com/explore/marketing-strategy](http://www.entrepreneur.com/explore/marketing-strategy)



## **2014: Featured Snippets**

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Google marketing

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About 1,690,000,000 results

**Marketing** is a form of communication between you and your customer with the goal of selling your product or service to them. Communicating the value of your product or service is a key aspect of **marketing**

**Marketing News & Topics - Entrepreneur**  
[www.entrepreneur.com/topic/marketing](http://www.entrepreneur.com/topic/marketing)

**Business development** is the process of marketing, sales, and development strategies to grow a company. [www.yourselfsolo.com](http://www.yourselfsolo.com)

**Explore Business development**

**Business Networking** is a skill and a low cost method of marketing that is used to build new business contacts through connecting with other like minded individuals [www.alreadied.com](http://www.alreadied.com)

**Explore Business networking**

**Marketing strategies** serve as the fundamental underpinning of marketing plans designed to fit market needs and reach marketing objectives. [www.pinkapple.com](http://www.pinkapple.com)

**Explore Marketing strategy**

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www.ferrari.it/cb-hn/world/ferrariworld/scripts/home/home.jsp?BV\_UseBVCookie=no&language=ENGLISH -

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www.ferrarimarketletter.com - 28k - Nov. 2, 2002 - Cached - Similar pages

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www.ferrariownersclub.co.uk/ - 3k - Cached - Similar pages

## 2007: Universal Search

## 2012: Knowledge Graph

## 2023: Generative AI

Bank of America - Get Free Checking, Online Banking, And More. Open Today. Official Site  
Bank of America Home | Personal  
Bank of America is the nation's leading financial institution and home for all of your personal financial needs.

Learn more Contact us Call for more info  
Locate a branch  
Locate a branch  
Locate a branch  
Locate a branch  
More details from bankofamerica.com

Bank of America Online Banking - Online Banking Overview from Bank ...  
Discover why more than 20 million people choose Bank of America Online Banking. With more than 10,000 ATMs and 3,000 branches nationwide, you can access your account 24/7. Call 1-800-234-1313.

Bank of America Online Banking - Online Banking Overview from Bank ...  
People's United Bank provides consumer, commercial, insurance, real investment, wealth management, and trust services to individuals and businesses ...  
www.peoplesunited.com - 28k - Cached - Similar pages

News results for Bank  
Bank of America profits and bank stocks higher - 1 hour ago  
NEW YORK (AP) — Another day, another record for the broader market. Monday, following the Associated Press' 300-point rally, the Dow Jones Industrial Average closed at a record high of 13,233.21, up 33.31 points.

Local business results for bank near San Francisco, CA - Change location  
A. Bank of America - www.bankofamerica.com - (415) 933-2541 - 1 review  
B. Wells Fargo Bank - www.wellsfargo.com - (415) 933-2541 - 1 review  
C. Wells Fargo Bank Nt Ctr - www.wellsfargo.com - (415) 889-3657 - 3 reviews  
D. Chase - www.chase.com - (415) 933-2541 - 1 review  
E. Bank of America - www.bankofamerica.com - (415) 933-2541 - 1 review  
F. Wells Fargo Bank Nt Farwest & Lnt - www.wellsfargo.com - (650) 885-3557 - 1 review  
G. Bank of America - www.bankofamerica.com - (415) 933-2541 - 1 review  
H. Bank of America - www.bankofamerica.com - (415) 933-2541 - 1 review  
I. Bank of America - www.bankofamerica.com - (415) 933-2541 - 1 review  
J. Bank of America - www.bankofamerica.com - (415) 933-2541 - 1 review  
More results near San Francisco, CA

Nation's Largest Banks  
This is a list of the largest banks and savings institutions in the United States ranked by total assets in thousands of dollars ...  
www.bankrate.com - 2k - Cached - Similar pages

Wells Fargo Home Page  
Start to bank and pay bills online. Wells Fargo provides personal banking, investing services, and more. Visit us online at wells Fargo.com or call 1-800-789-7000.

www.wellsfargo.com - 10k - Cached - Similar pages

The Wells Fargo Bank  
Headquartered in San Francisco, the Wells Fargo Bank Group offers home, auto, and an array of customized resources to more than 100 developing countries and countries ...  
www.wellsfargo.com - 10k - Cached - Similar pages

BANK  
Bank of America, publishers, press contact  
www.bankofamerica.com - 2k - Cached - Similar pages

Bank Out! Banks Face Probe Over Fed Help - WSJ.com  
For the first time, the Federal Reserve is investigating whether the government face intended to shield itself from TARP's deepest collateral following ...  
usatoday.com - 10k - Cached - Similar pages

Neocat - Login Form  
Neocat.com - Virtual Business Center for Web sites, shops, auctions, chat and more. Create a free Neocat account now!

www.neocat.com - 25k - Cached - Similar pages

Blog posts about bank  
Global Payments' plan to split off its bank arm - India's Indiabulls - April 11, 2009  
Global Voice Online - Creator: Creative New Social Security - Global Voice Online - 15 hours ago  
Skinner Roads Readiness Card Skinner On Card CM - Consumer - Apr 8, 2009

Books about bank  
The World Bank's Impact of Rural Electrification - A ... - 170 pages  
World Development Report: The Development ... - by World Bank, Staff, World Bank Group - 226 pages

Searches related to bank  
Bank of America - 1st bank of the world  
Community bank  
Bank United  
1st bank  
Bank of America  
World bank

## 2014: Featured Snippets

Marketing - Wikipedia, the free encyclopedia  
The Taj Mahal is a white marble mausoleum located in Agra, India. It was built by Mughal Emperor Shah Jahan in memory of his favorite wife, Mumtaz Mahal. The ...  
Origin and architecture of the ... - Mumtaz Mahal - Shah Jahan - Agra

Taj Mahal (musical) - Wikipedia, the free encyclopedia  
On release originally titled "Mahal," produced by Ravi Kapoor, the album reached No. 1 on the Indian charts. It won the 1997 Indian Filmfare Award for Best Music. It also won the 1997 Indian National Film Award for Best Soundtrack. It is an American Grammy Award winning Music masterpiece. He incorporates ...

Atlantic City New Jersey Casino Hotels | Trump Taj Mahal, Atlantic ...  
From luxury to budget, Trump Taj Mahal offers restaurants, nightclubs and a casino floor that never closes. Explore our Atlantic City ...

Taj Mahal - Wikipedia, the free encyclopedia  
Symbol of Justice of Judgment, SH-62 282001, Agra, Uttar Pradesh, India  
Height: 561 feet (171 m)  
Opened: 1653  
Architectural style: Mughal architecture  
Phase: 1652-1652  
Architect: Ustad Ahmad Lahari

About 1,690,000,000 results

Marketing is a form of communication between you and your customers with the goal of selling your product or service to them. Communicating the value of your product or service is a key aspect of marketing.

Marketing News & Topics - Entrepreneur  
www.entrepreneur.com/topic/marketing

Business development is the process of marketing, sales, and development strategies for your company. [www.entrepreneur.com/article/204937](#)

Business networking is a skill and a low cost method of marketing that is used to build new business contacts through connecting with other like minded individuals. [www.entrepreneur.com/article/204938](#)

Marketing strategies serve as the fundamental underpinning of marketing plans designed to fit market needs and reach marketing objectives. [www.entrepreneur.com/article/204939](#)

what's better for a family with kids under 3 and a dog, bryce canyon or x

Converse Shopping Images Videos News Maps Books Flights Finance

Generative AI is experimental

Both Bryce Canyon and Arches National Parks are family-friendly. Although both parks prohibit dogs on unpaved trails, Bryce Canyon has two paved trails that allow dogs.

Bryce Canyon has distinctive features like hoodoos, natural bridges, and waterfalls. At the visitor's center's interactive exhibits, children can learn about the geology, wildlife, and people of the area. You can bring your dog on the paved sections of both the Rim Trail and the Shared Use Path, both of which are also stroller-friendly.

At Arches, children may enjoy the rock formations, and some say that Arches has more variety than Bryce Canyon. Pets aren't allowed on any trails, though they are allowed at campgrounds, pullouts, roads, and parking lots.

Both parks offer guided tours, ranger-led programs, picnic areas, and restrooms, and both parks require pets to be leashed.

Ask a follow up How long to spend at Bryce Canyon with kids? How many days do you need

Action Tour Guide  
<https://actiontourguide.com> • 2022/03/17 • which-is-best

Action Tour Guide  
Feb 17, 2022 — Arches only allow dogs at campgrounds, parking lots, and along established roads; making it a lot harder to experience the park with your dog.

The MOM Trotter  
<https://themomtrotter.com> • bryce-canyon-national-pa...

A Guide To Planning A Trip To Bryce Canyon National ...

# Motivation 1: Good Abandonment

- **Definition:** A user's information need is successfully addressed by the results page with no need to click on a result [1]

[1] Li, J.; Huffman, S.; and Tokuda, A. 2009. Good abandonment in mobile and PC internet search. In *Proceedings of the 32nd international ACM SIGIR conference on Research and development in information retrieval*.

# Motivation 1: Good Abandonment

- **Definition:** A user's information need is successfully addressed by the results page with no need to click on a result [1]
- Wikipedia visitation rate increases from 11.1% to 20.5% when Wikipedia knowledge components removed [2]

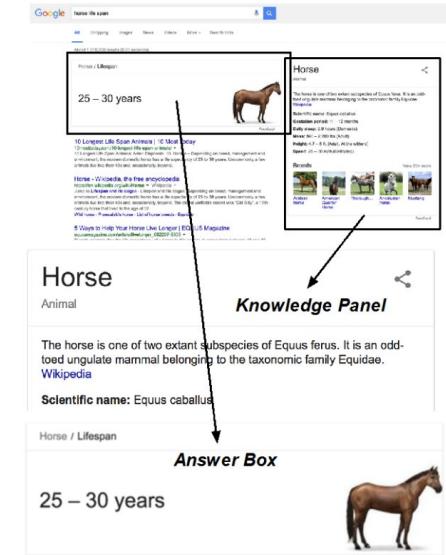


Figure 1: A "Knowledge Panel" and "Rich Answer"

[2] McMahon, C.; Johnson, I.; and Hecht, B. 2017. The Substantial Interdependence of Wikipedia and Google: A Case Study on the Relationship Between Peer Production Communities and Information Technologies. In *Proceedings of the International AAAI Conference on Web and Social Media*.

# Research Question 1

What effect do **extracted results** have on **behavior**, measured through  
(1) click-through rate (CTR) and (2) time on the results page?

A screenshot of a search results page from a search engine. The search bar at the top contains the query "ny voter registration". Below the search bar, there are several filters: All, News, Images, Maps, Shopping, More, Settings, and Tools. The main content area shows a snippet for "How to register to vote" under "2020 US general election". It includes a small American flag icon and a dropdown menu showing "State: New York". Below this, a paragraph explains online voter registration in New York, mentioning that you can register by mail or print a form. Another section titled "Who can vote" lists the requirements: being a citizen of the United States, being a resident of the state or city, being at least 18 years old, not being in jail or on parole for a felony conviction, not currently being judged incompetent, and not claiming the right to vote elsewhere. A note at the bottom encourages finding more information on voting rights restoration.

Direct-Answer

A screenshot of a search results page for the query "how long do mushrooms last". The search bar shows the query. Below it are filters: All, Books, Shopping, News, Images, More, and Tools. There are also several smaller search boxes labeled "cooked", "after buying", "cook", "pill", and "eat". The main content area features a snippet from "How to Store Mushrooms to Maximize Their Freshness - 2022" by MasterClass. The snippet states: "Whole mushrooms: Most whole mushrooms bought from the grocery store can last in the refrigerator for up to two weeks. It is advisable to consume them within seven to ten days of purchase." Below the snippet is the URL "https://www.masterclass.com/articles/how-to-store-mus...".

Featured-Snippet

A screenshot of a search results page for "multilevel regression". The search bar shows the query. Below it are filters: All, Videos, Images, News, Shopping, More, and Tools. The main content area shows a snippet from Wikipedia about multilevel models. It defines them as statistical models that recognize the existence of such data hierarchies by allowing for residual components at each level in the hierarchy. Below the snippet is a section titled "People also ask" with questions like "What is Multi Level regression?", "When would you use a multilevel model?", "What is the point of multilevel modeling?", and "What does multilevel approach mean?". At the bottom, there is a link to the Wikipedia page on Multilevel model.

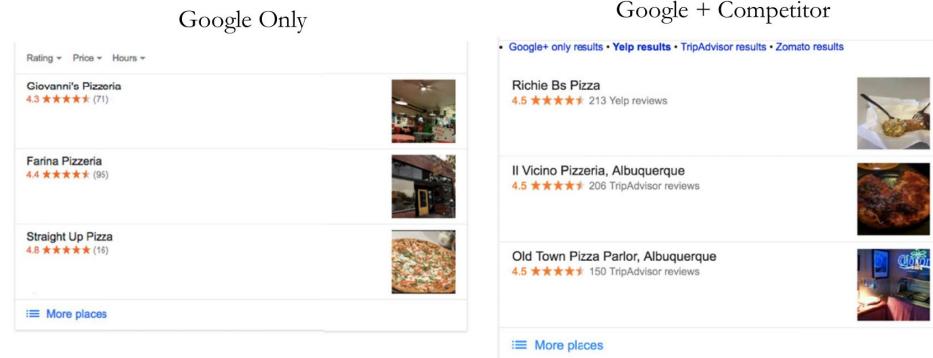
Knowledge-Panel

## Motivation 2: Self-Preferencing

- **Definition:** A gatekeeper treats their own product or service more favorably than similar products or services offered by third-parties [3]

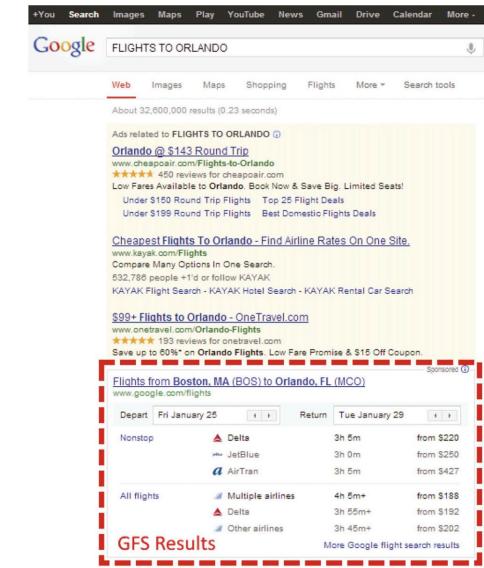
# Motivation 2: Self-Preferencing

- **Definition:** A gatekeeper treats their own product or service more favorably than similar products or services offered by third-parties [3]
- Users prefer Local-Results that include reviews from competitors (e.g. Yelp, TripAdvisor) [4]



# Motivation 2: Self-Preferencing

- **Definition:** A gatekeeper treats their own product or service more favorably than similar products or services offered by third-parties [3]
- Google Flights decreases organic clicks to competitors by 55% and increases paid clicks by 65% [4]



[4] Edelman, B.; and Lai, Z. 2016. Design of search engine services: Channel interdependence in search engine results. *Journal of Marketing Research*, 53(6)

## Research Question 2

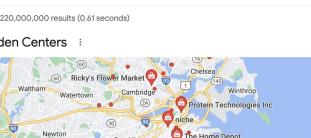
What effect do **Google Services** have on **traffic**, measured through  
(1) organic CTR to 1st-parties and (2) organic CTR to 3rd-parties?

[flower pots](#)

[All](#) [Shopping](#) [Images](#) [Maps](#) [Books](#) [More](#)

About 220,000,000 results (0.61 seconds)

## Garden Centers :



Keypad shortcuts · Map data ©2020 Google · Terms of Use

**Rating** **Hours**

### The Home Depot

4.5 ★★★★★ (1,8K) · \$ - Home Improvement store  
5 Allstate Rd - In South Bay Center - (617) 442-6110  
Open - Closes 9PM  
🕒 In stock: flower pots - Updated 1 day ago

### niche

4.6 ★★★★★ (86) · Garden center  
619 Tremont St - (617) 753-4294  
Closed - Opens 11AM Wed  
🕒 Seen by shoppers: flower pots

### Ricky's Flower Market

4.7 ★★★★★ (42) · Garden center  
Somerville, MA - (817) 626-7689  
Open - Closes 7PM  
🕒 Seen by shoppers: flower pots

→ More places

## Local-Results

A screenshot of a search results page for "causal effect image". The top navigation bar includes links for All, Images, News, Videos, Shopping, More, Tools, and a magnifying glass icon. Below the search bar, it says "About 3,900,000,000 results (0.69 seconds)". The main content area displays a grid of 12 images related to causal inference. The images include: 1) A diagram with arrows labeled "Cause" and "Effect". 2) A hand holding a pencil over a row of pins. 3) A hand writing "CAUSE EFFECTS" on a chalkboard. 4) A snowman standing next to a cloud with a lightning bolt, labeled "Cause & Effect". 5) A hand holding a pencil over a chalkboard with "EFFECT" and "CAUSE" written on it. 6) A hand holding a pencil over a chalkboard with a circular arrow labeled "Cause Effect". 7) A hand holding a pencil over a chalkboard with a question mark inside a circle. 8) A hand holding a pencil over a chalkboard with a causal diagram. 9) A hand holding a pencil over a chalkboard with a graph titled "CORRELATION IS NOT CAUSATION". 10) A hand holding a pencil over a chalkboard with a causal diagram. 11) A hand holding a pencil over a chalkboard with a causal diagram. 12) A hand holding a pencil over a chalkboard with a causal diagram.

## Images

hiking shoes

🔍 All ⚡ Shopping 🖼 Images ⛅ Maps 📰 News ⋮ More Tools

Women Men Kids Girls WaterproofNearbyNike

About 212,000,000 results (0.93 seconds)

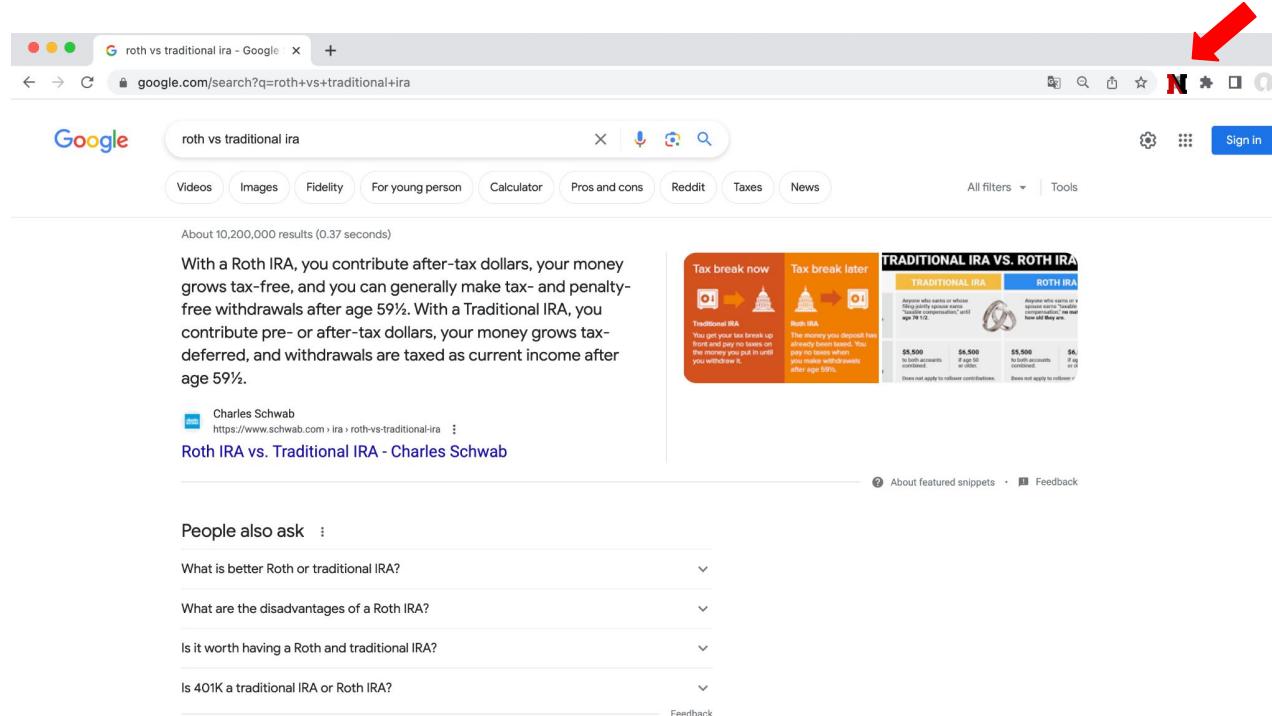
Ads - Shop hiking shoes



Merrell Men's Moab 2 ... \$110.00 Merrell.com	Eddie Bauer Men's Lukia ... \$70.00 Eddie Bauer	Columbia Men's Lippet III \$65.83 REI	Eddie Bauer Men's Lukia ... \$55.00 Eddie Bauer	Columbia Men's ... \$67.98 Columbia S...
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# Shopping-Ads

# Data Collection



roth vs traditional ira - Google

google.com/search?q=roth+vs+traditional+ira

Google roth vs traditional ira

Videos Images Fidelity For young person Calculator Pros and cons Reddit Taxes News All filters Tools Sign in

About 10,200,000 results (0.37 seconds)

With a Roth IRA, you contribute after-tax dollars, your money grows tax-free, and you can generally make tax- and penalty-free withdrawals after age 59½. With a Traditional IRA, you contribute pre- or after-tax dollars, your money grows tax-deferred, and withdrawals are taxed as current income after age 59½.

Charles Schwab https://www.schwab.com/ira/roth-vs-traditional-ira Roth IRA vs. Traditional IRA - Charles Schwab

People also ask :

What is better Roth or traditional IRA?

What are the disadvantages of a Roth IRA?

Is it worth having a Roth and traditional IRA?

Is 401K a traditional IRA or Roth IRA?

Feedback

**TAX BREAKS**

**Tax break now** Traditional IRA: You contribute up front and pay no taxes on the money you put in until you withdraw it.

**Tax break later** Roth IRA: You contribute after taxes have already been paid. You pay no taxes when you withdraw your savings after age 59½.

**TRADITIONAL IRA VS. ROTH IRA**

Traditional IRA	Roth IRA
Anyone who earns or whose employer offers "eligible compensation," until age 70½.	Anyone who earns or whose employer offers "eligible compensation," until age 70½.
\$5,500 to \$6,500 annually or older.	\$5,500 to \$6,500 annually or older.
\$5,500 to \$6,500 annually or older.	\$5,500 to \$6,500 annually or older.
Does not apply to rollover contributions.	Does not apply to rollover contributions.

# Data Collection

Google search results for "roth vs traditional ira".

Search bar: google.com/search?q=roth+vs+traditional+ira

Google logo, search bar, and navigation buttons.

Videos, Images, Fidelity, For young person, Calculator, Pros and cons, Reddit, Taxes, News, All filters, Tools.

About 10,200,000 results (0.37 seconds)

With a Roth IRA, you contribute after-tax dollars, your money grows tax-free, and you can generally make tax- and penalty-free withdrawals after age 59½. With a Traditional IRA, you contribute pre- or after-tax dollars, your money grows tax-deferred, and withdrawals are taxed as current income after age 59½.

Charles Schwab  
<https://www.schwab.com/ira/roth-vs-traditional-ira>

Roth IRA vs. Traditional IRA - Charles Schwab

**Tax break now** **Tax break later**

**Traditional IRA** You contribute up front and pay no taxes on the money you put in until you withdraw it.

**Roth IRA** You contribute after taxes have already been paid. You pay no taxes when you withdraw your savings after age 59½.

**TRADITIONAL IRA VS. ROTH IRA**

TRADITIONAL IRA	ROTH IRA
Anyone who earns or whose employer provides "eligible compensation," until age 59½.	Anyone who earns or whose employer provides "eligible compensation," no matter how old they are.
\$5,500 to \$6,500 annually or older	\$5,500 to \$6,500 annually or older
Does not apply to rollover contributions.	Does not apply to rollover contributions.

Feedback

People also ask:

- What is better Roth or traditional IRA?
- What are the disadvantages of a Roth IRA?
- Is it worth having a Roth and traditional IRA?
- Is 401K a traditional IRA or Roth IRA?

# Data Collection

Google search results for "roth vs traditional ira" on Google.com.

About 10,200,000 results (0.37 seconds)

With a Roth IRA, you contribute after-tax dollars, your money grows tax-free, and you can generally make tax- and penalty-free withdrawals after age 59½. With a Traditional IRA, you contribute pre- or after-tax dollars, your money grows tax-deferred, and withdrawals are taxed as current income after age 59½.

**Charles Schwab**  
<https://www.schwab.com/ira/roth-vs-traditional-ira>

**Roth IRA vs. Traditional IRA - Charles Schwab**

**Tax break now** **Tax break later**

**Traditional IRA** You contribute up front and pay no taxes on the money you put in until you withdraw it.

**Roth IRA** You contribute after taxes have already been paid. You pay no taxes when you withdraw your savings after age 59½.

**TRADITIONAL IRA VS. ROTH IRA**

TRADITIONAL IRA	ROTH IRA
Anyone who earns or whose employer provides "eligible compensation," until age 59½.	Anyone who earns or whose employer provides "eligible compensation," no matter how old they are.
\$5,500 to \$6,500 annually or less, depending on your age and filing status.	\$5,500 to \$6,500 annually or less, depending on your age and filing status.
\$5,500 to \$6,500 annually or less, depending on your age and filing status.	\$6,500 to \$7,500 annually or less, depending on your age and filing status.
Does not apply to rollover contributions.	Does not apply to rollover contributions.

People also ask :

- What is better Roth or traditional IRA?
- What are the disadvantages of a Roth IRA?
- Is it worth having a Roth and traditional IRA?
- Is 401K a traditional IRA or Roth IRA?

Feedback

# Data Collection

The screenshot shows a Google search results page for the query "roth vs traditional ira". The search bar at the top contains the query "roth vs traditional ira". Below the search bar, there are several navigation links: Videos, Images, Fidelity, For young person, Calculator, Pros and cons, Reddit, Taxes, News, All filters, and Tools. The main content area displays a snippet from Charles Schwab's website. To the right of the snippet is a comparison chart titled "TRADITIONAL IRA VS. ROTH IRA" comparing the two types of IRAs based on tax treatment and contribution rules.

About 10,200,000 results (0.37 seconds)

With a Roth IRA, you contribute after-tax dollars, your money grows tax-free, and you can generally make tax- and penalty-free withdrawals after age 59½. With a Traditional IRA, you contribute pre- or after-tax dollars, your money grows tax-deferred, and withdrawals are taxed as current income after age 59½.

Charles Schwab  
<https://www.schwab.com/ira/roth-vs-traditional-ira>

Roth IRA vs. Traditional IRA - Charles Schwab

People also ask:

- What is better Roth or traditional IRA?
- What are the disadvantages of a Roth IRA?
- Is it worth having a Roth and traditional IRA?
- Is 401K a traditional IRA or Roth IRA?

Feedback

Traditional IRA	Roth IRA
Anyone who earns or whose employer provides "eligible compensation," until age 59½.	Anyone who earns or whose employer provides "eligible compensation," until age 59½.
\$5,500 to \$6,500 annually, depending on age and account balance.	\$5,500 to \$6,500 annually, depending on age and account balance.
Does not apply to rollover contributions.	Does not apply to rollover contributions.

From Aug to Dec 2020 we collected 850,000+ results pages from 1,900+ participants<sup>17</sup>

# Method: Treatment Definition

## Treatment

roth vs traditional ira - Google

google.com/search?q=roth+vs+traditional+ira

Google

roth vs traditional ira

Videos Images Fidelity For young person Calculator Pros and cons Reddit Taxes News

All filters Tools

About 10,200,000 results (0.37 seconds)

With a Roth IRA, you contribute after-tax dollars, your money grows tax-free, and you can generally make tax- and penalty-free withdrawals after age 59½. With a Traditional IRA, you contribute pre- or after-tax dollars, your money grows tax-deferred, and withdrawals are taxed as current income after age 59½.

**Charles Schwab**  
<https://www.schwab.com/ira/roth-vs-traditional-ira>

**Roth IRA vs. Traditional IRA - Charles Schwab**

**TRADITIONAL IRA VS. ROTH IRA**

**Traditional IRA**

You get your tax break up front and pay no taxes on your contributions in and when you withdraw it.

**Roth IRA**

The money you deposit has already been taxed. You can withdraw it at any time when you make withdrawals after age 59½.

Feedback

People also ask :

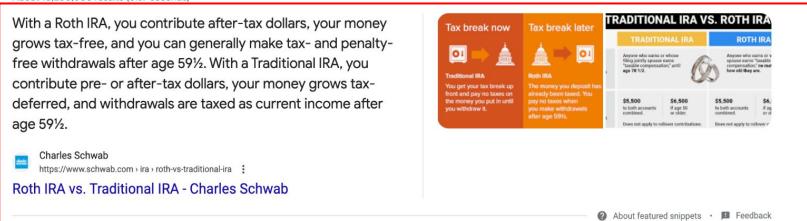
What is better Roth or traditional IRA?

What are the disadvantages of a Roth IRA?

Is it worth having a Roth and traditional IRA?

Is 401K a traditional IRA or Roth IRA?

Feedback



# Method: Outcome Definition (RQ1)

## Treatment

A screenshot of a Google search results page for the query "roth vs traditional ira". The results are filtered by "Tools" and show a featured snippet from Charles Schwab. The snippet compares Roth and Traditional IRAs based on tax breaks and growth potential.

**With a Roth IRA, you contribute after-tax dollars, your money grows tax-free, and you can generally make tax- and penalty-free withdrawals after age 59½. With a Traditional IRA, you contribute pre- or after-tax dollars, your money grows tax-deferred, and withdrawals are taxed as current income after age 59½.**

**Traditional IRA:** You get your tax break up front and pay no taxes on your contributions until you withdraw it.

**Roth IRA:** The money you deposit has already been taxed. You don't have to pay taxes when you make withdrawals after age 59½.

**TRADITIONAL IRA VS. ROTH IRA**

Traditional IRA	Roth IRA
\$5,500 to both accounts	\$5,500 to both accounts
If age 50 or older, \$1,000 additional contribution	If age 50 or older, \$1,000 additional contribution
Does not apply to rollover contributions.	Does not apply to rollover contributions.

**People also ask :**

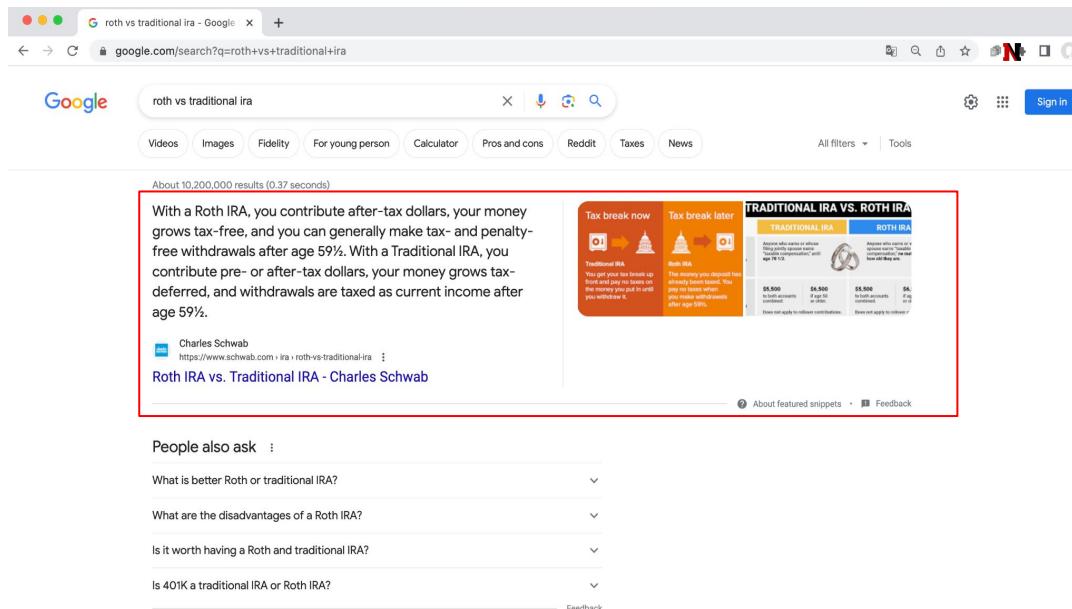
- What is better Roth or traditional IRA?
- What are the disadvantages of a Roth IRA?
- Is it worth having a Roth and traditional IRA?
- Is 401K a traditional IRA or Roth IRA?

## Outcomes: Behavior (RQ1)

1. Click-through rate (CTR)
2. Time on the results page

# Method: Outcome Definition (RQ2)

## Treatment



## Outcomes: Behavior (RQ1)

1. Click-through rate (CTR)
2. Time on the results page

## Outcomes: Traffic (RQ2)

1. Organic CTR to 1st-parties
2. Organic CTR to 3rd-parties

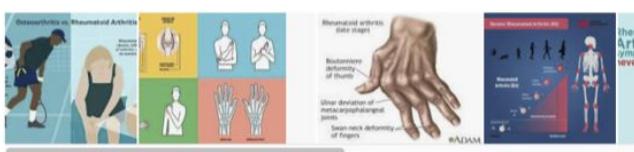
# Method: Matching

## Search Results Page A

rheumatoid arthritis

All News Images Videos Books More Settings Tools

About 41,100,000 results (0.55 seconds)



Rheumatoid arthritis (RA) is the most common type of autoimmune arthritis. It is caused when the immune system (the body's defense system) is not working properly. RA causes pain and swelling in the wrist and small joints of the hand and feet. Treatments for RA can stop joint pain and swelling.

**Symptoms:** Arthralgia; Joint stiffness...

**Treatments:** Disease-modifying antirheumatic drug

R www.rheumatology.org I-Am-A Patient-Caregiver Rheumatoid-Ar...

Diseases and Conditions Rheumatoid Arthritis

About Featured Snippets Feedback

## Search Results Page B

Rheumatoid arthritis

All News Images Videos Books More Settings Tools

About 37,100,000 results (0.46 seconds)

www.mayoclinic.org symptoms-causes syc-20353648

### Rheumatoid arthritis - Symptoms and causes - Mayo Clinic

Mar 1, 2019 - Rheumatoid arthritis is a chronic inflammatory disorder that can affect more than just your joints. In some people, the condition can damage a wide variety of body systems, including the skin, eyes, lungs, heart and blood vessels.

**Diagnosis and treatment**

Vaccines - Rheumatoid factor -  
Rheumatoid arthritis diet - ...

[More results from mayoclinic.org](#)

**People also ask**

What are first signs of rheumatoid arthritis?

What are the 4 stages of rheumatoid arthritis?

# Method: Matching

## Search Results Page A

X Microphone Search

All News Images Videos Books More Settings Tools

About 41,100,000 results (0.55 seconds)

Rheumatoid arthritis (RA) is the most common type of autoimmune **arthritis**. It is caused when the immune system (the body's defense system) is not working properly. RA causes pain and swelling in the wrist and small joints of the hand and feet. Treatments for RA can stop joint pain and swelling.

**Symptoms:** Arthralgia; Joint stiffness...

**Treatments:** Disease-modifying antirheumatic drug

 [www.rheumatology.org/I-Am-A/Patient-Caregiver/Rheumatoid-Arthritis](http://www.rheumatology.org/I-Am-A/Patient-Caregiver/Rheumatoid-Arthritis)

[Diseases and Conditions Rheumatoid Arthritis](#)

About Featured Snippets Feedback

### People also ask

What is the main cause of rheumatoid arthritis?

How serious is rheumatoid arthritis?

## Search Results Page B

X Search

All News Images Videos Books More Settings Tools

About 37,100,000 results (0.46 seconds)

[www.mayoclinic.org/symptoms-causes/syc-20353648](http://www.mayoclinic.org/symptoms-causes/syc-20353648) ▾

**Rheumatoid arthritis - Symptoms and causes - Mayo Clinic**

Mar 1, 2019 - Rheumatoid arthritis is a chronic inflammatory disorder that can affect more than just your joints. In some people, the condition can damage a wide variety of body systems, including the skin, eyes, lungs, heart and blood vessels.

**Diagnosis and treatment**

Vaccines - Rheumatoid factor -  
Rheumatoid arthritis diet - ...

[More results from mayoclinic.org](#) ▾

**People also ask**

What are first signs of rheumatoid arthritis? ▾

What are the 4 stages of rheumatoid arthritis? ▾

# Method: Matching

Search Results Page A

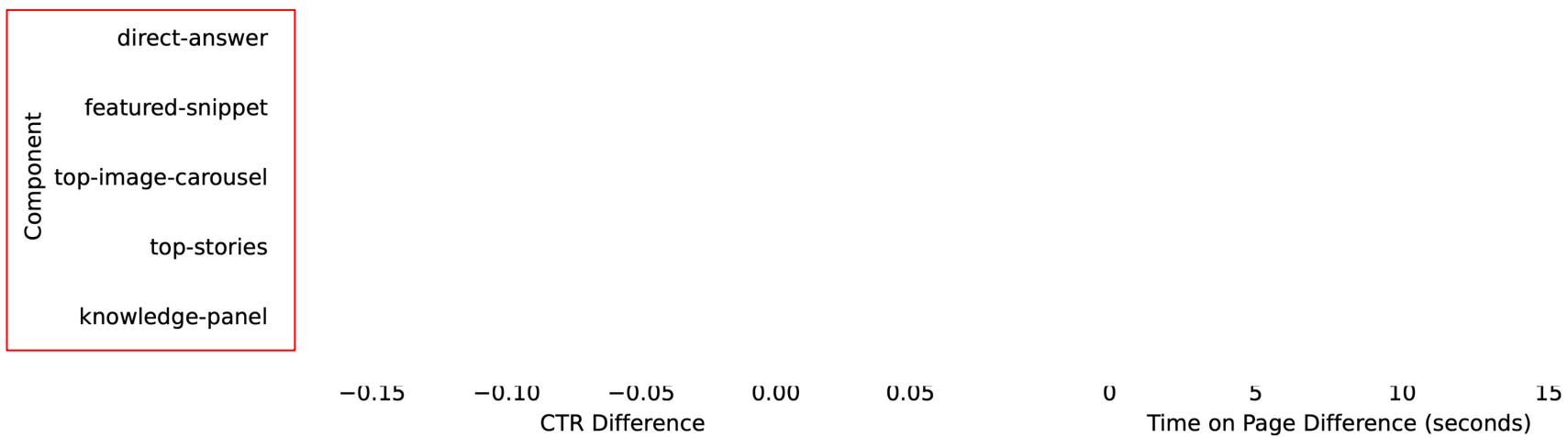
A screenshot of a Google search results page for the query "rheumatoid arthritis". The search bar at the top contains the text "rheumatoid arthritis". Below the search bar, there are tabs for All, News, Images, Videos, Books, and More. The "All" tab is selected. The results section shows a "About 41,100,000 results (0.55 seconds)" message. The first result is a featured snippet with the title "Rheumatoid arthritis (RA) is the most common type of autoimmune arthritis". The snippet includes a paragraph of text about RA, followed by sections for "Symptoms" (Arthralgia; Joint stiffness...) and "Treatments" (Disease-modifying antirheumatic drug). Below the snippet is a link to "www.rheumatology.org". Further down, there is a "Diseases and Conditions Rheumatoid Arthritis" section. At the bottom of the snippet area, there are links for "About Featured Snippets" and "Feedback". Below the snippet, there is a "People also ask" section with two questions: "What is the main cause of rheumatoid arthritis?" and "How serious is rheumatoid arthritis?".

Search Results Page B

A screenshot of a Google search results page for the query "Rheumatoid arthritis". The search bar at the top contains the text "Rheumatoid arthritis". Below the search bar, there are tabs for All, News, Images, Videos, Books, and More. The "All" tab is selected. The results section shows a "About 37,100,000 results (0.46 seconds)" message. The first result is a link to "www.mayoclinic.org" with the title "Rheumatoid arthritis - Symptoms and causes - Mayo Clinic". The snippet from this result includes a paragraph about RA being a chronic inflammatory disorder that can affect more than just joints, followed by sections for "Diagnosis and treatment" (Vaccines - Rheumatoid factor -; Rheumatoid arthritis diet - ...) and "Is depression a factor in ...". Below the snippet, there is a link to "More results from mayoclinic.org". Further down, there is a "People also ask" section with two questions: "What are first signs of rheumatoid arthritis?" and "What are the 4 stages of rheumatoid arthritis?".

- [5] Roberts, M. E.; Stewart, B. M.; and Nielsen, R. A. 2020. Adjusting for confounding with text matching. *American Journal of Political Science*, 64(4).
- [6] Keith, K. A.; Jensen, D.; and O'Connor, B. 2020. Text and causal inference: A review of using text to remove confounding from causal estimates. *arXiv preprint arXiv:2005.00649*.
- [7] Mozer, R.; Miratrix, L.; Kaufman, A. R.; and Anastasopoulos, L. J. 2020. Matching with text data: An experimental evaluation of methods for matching documents and of measuring match quality. *Political Analysis*, 28(4).

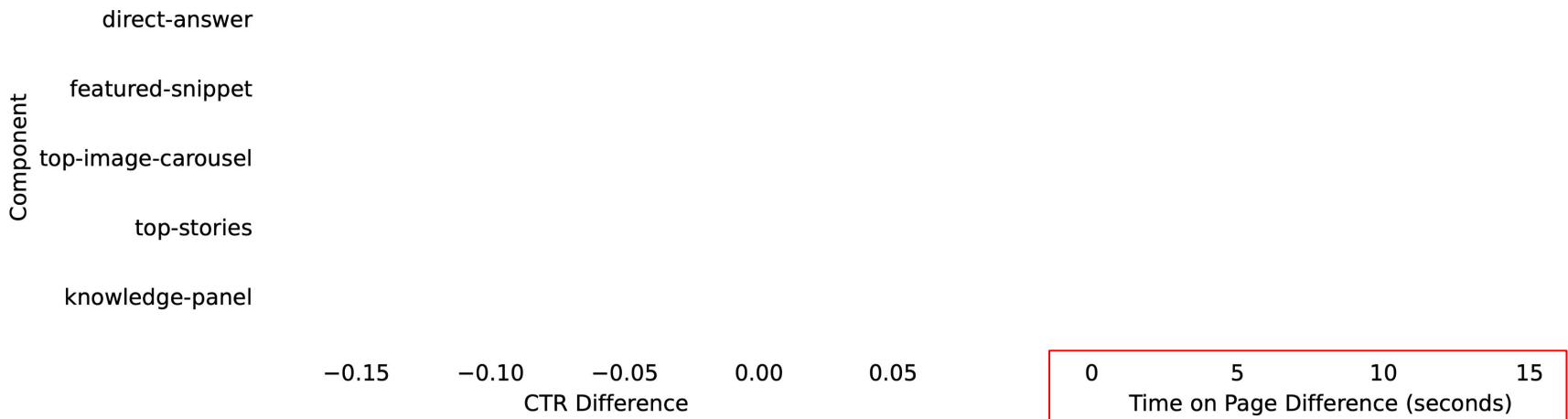
# Results: Effects of *Extracted Results* (RQ1)



# Results: Effects of Extracted Results (RQ1)

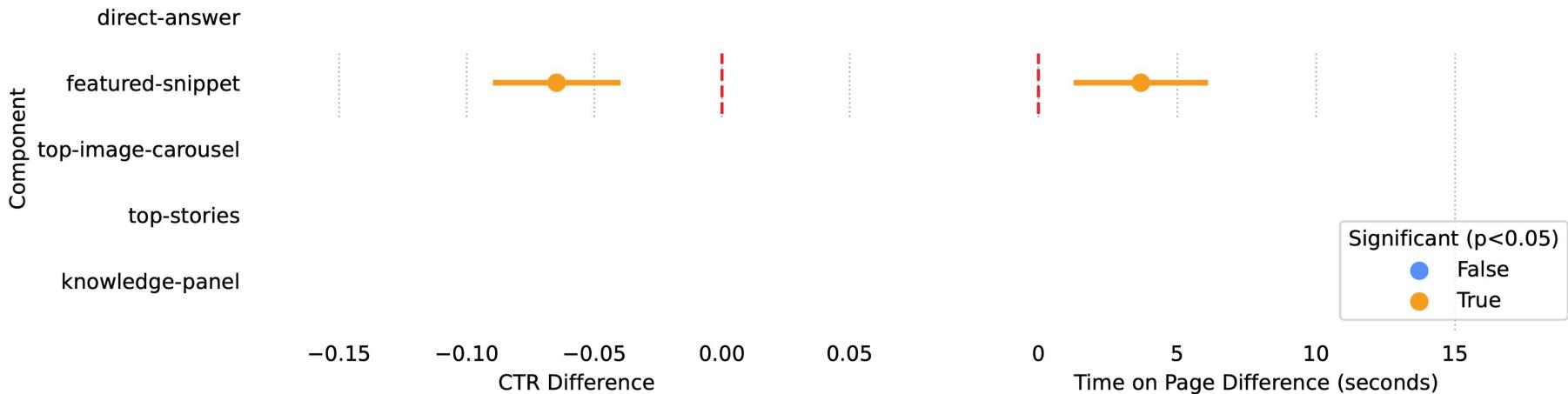


# Results: Effects of Extracted Results (RQ1)

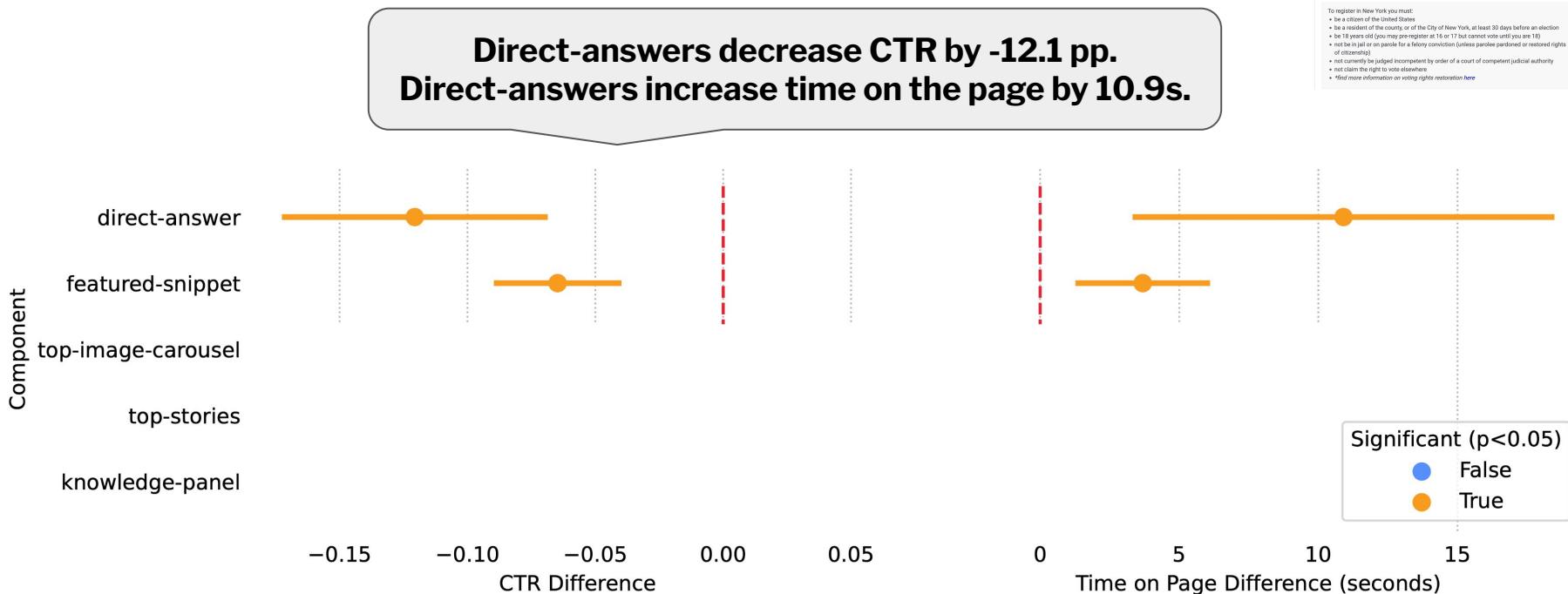


# Results: Effects of Extracted Results (RQ1)

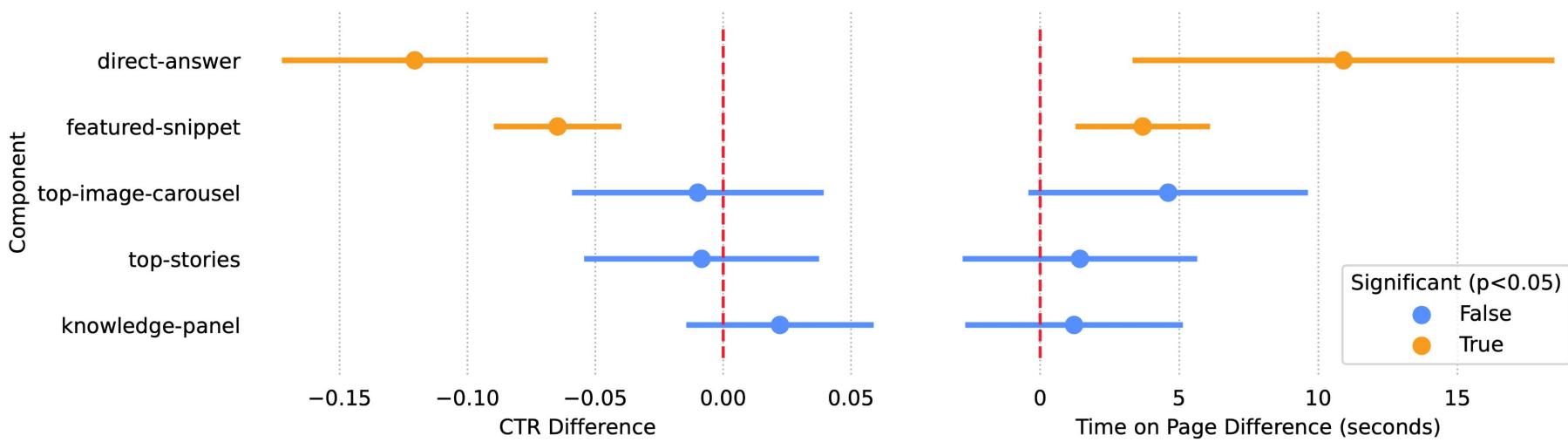
Featured-snippets decrease CTR by -6.5 pp.  
Featured-snippets increase time on the page by 3.7s.



# Results: Effects of Extracted Results (RQ1)



# Results: Effects of Extracted Results (RQ1)



# Discussion: *Extracted Results* (RQ1)

- Highlight work on the credibility and quality of knowledge components [8]

# Discussion: Extracted Results (RQ1)

- Highlight work on the credibility and quality of knowledge components [8]
- Conversational search intensifies concerns about [9]:
  - Good abandonment
  - Misappropriation of content
  - Information quality

The screenshot shows a conversational search interface with the following results:

- Generative AI is experimental**: Both Bryce Canyon and Arches National Parks are family-friendly. Although both parks prohibit dogs on unpaved trails, Bryce Canyon has two paved paths that allow dogs. Bryce Canyon has distinctive features like hoodoos, natural bridges, and waterfalls. At the visitor center's interactive exhibits, children can learn about the geology, wildlife, and people of the area. You can bring your dog on the paved sections of both the Rim Trail and the Shared Use Path, both of which are also stroller-friendly.
- At Arches, children may enjoy the rock formations, and some say that Arches has more variety than Bryce Canyon.** Pets aren't allowed on any trails, though they are allowed at campgrounds, pullouts, roads, and parking lots.
- Both parks offer guided tours, ranger-led programs, picnic areas, and restrooms, and both parks require pets to be leashed.**

Buttons at the bottom include "Ask a follow up", "How long to spend at Bryce Canyon with kids?", and "How many days do you need".

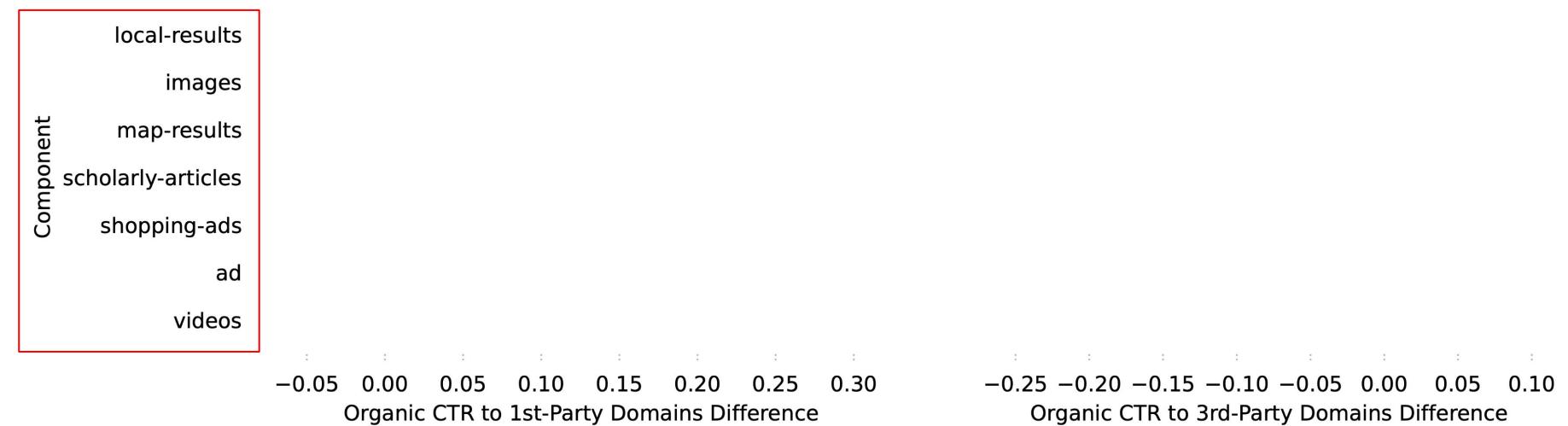
**Action Tour Guide**:  
Feb 17, 2022 — Arches only allows dogs at campgrounds, parking lots, and along established roads, making it a lot harder to experience the park with your dog.

**The MOM Trotter**:  
A Guide To Planning A Trip To Bryce Canyon National ...

[9] Robertson, K. 2023. Publishers Worry A.I. Chatbots Will Cut Readership.

<https://www.nytimes.com/2023/03/30/business/media/publishers-chatbots-search-engines.html>. Accessed: 2023-04-18.

# Results: Effects of Google Services (RQ2)



# Results: Effects of Google Services (RQ2)

Component

local-results

images

map-results

scholarly-articles

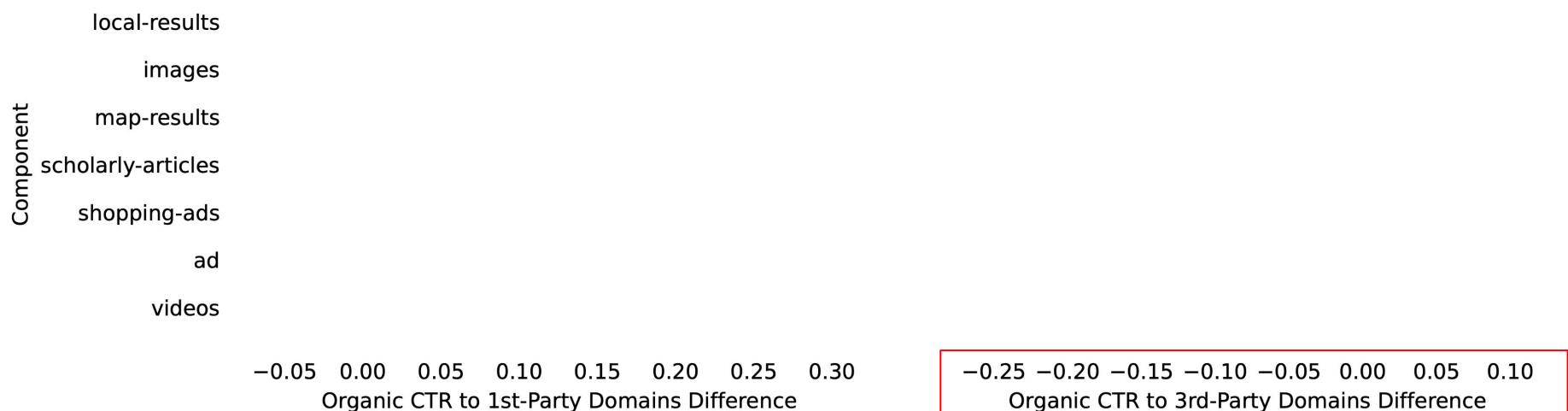
shopping-ads

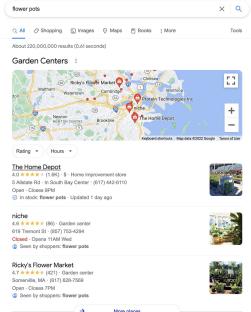
ad

videos



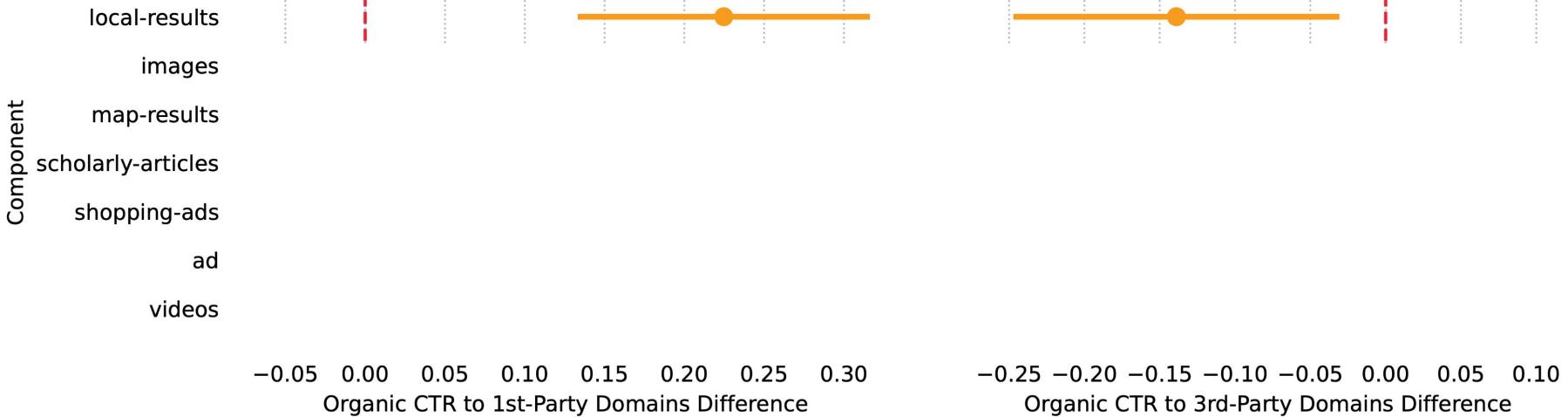
# Results: Effects of Google Services (RQ2)



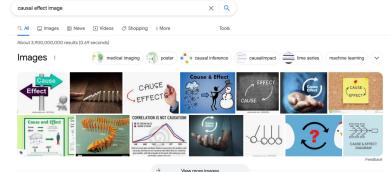


# Results: Effects of Google Services (RQ2)

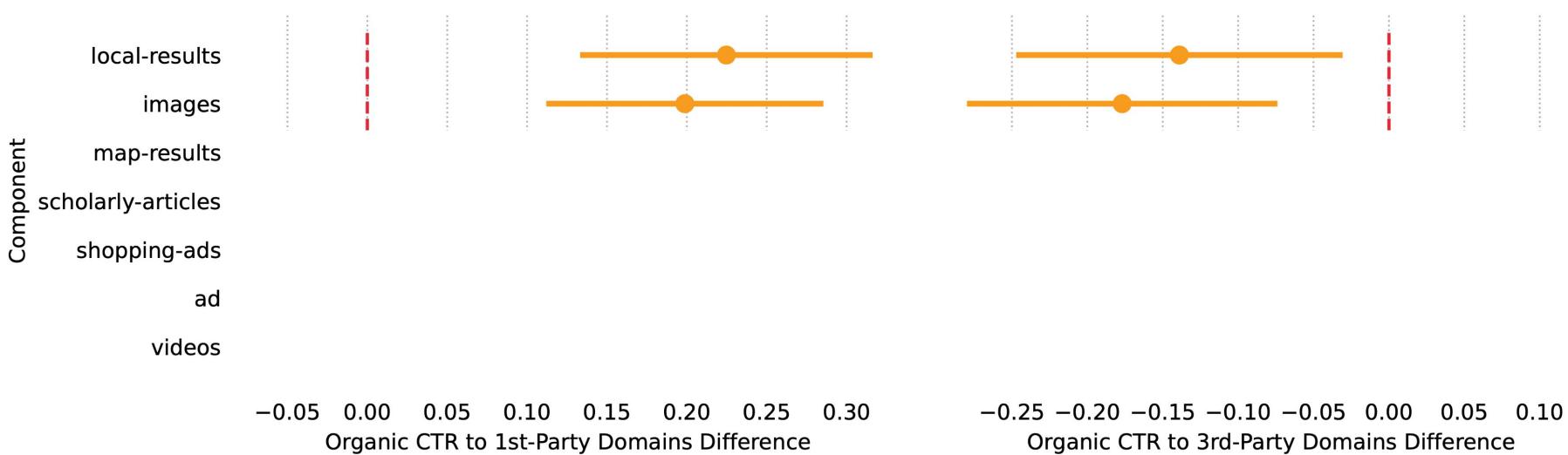
**Local-results increase organic CTR to Google by 22.5 pp.**  
**Local-results decrease organic CTR to 3rd-parties by -13.9 pp.**

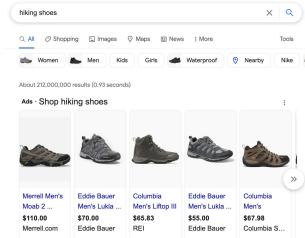


# Results: Effects of Google Services (RQ2)



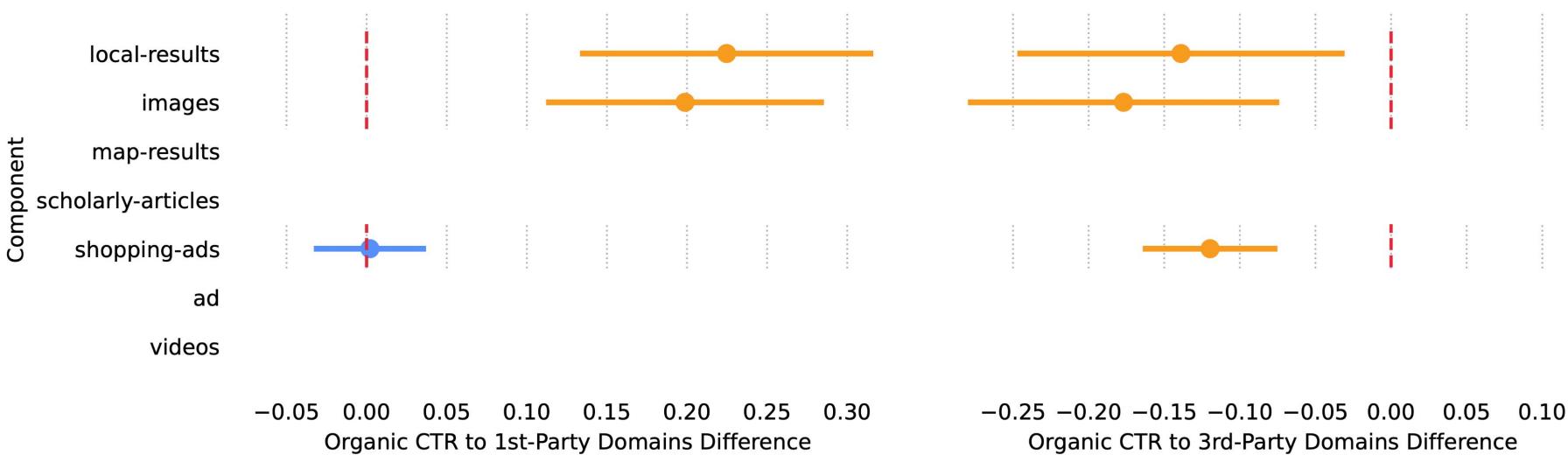
Images increase organic CTR to Google by 19.9 pp.  
Images decrease organic CTR to 3rd-parties by -17.7 pp.



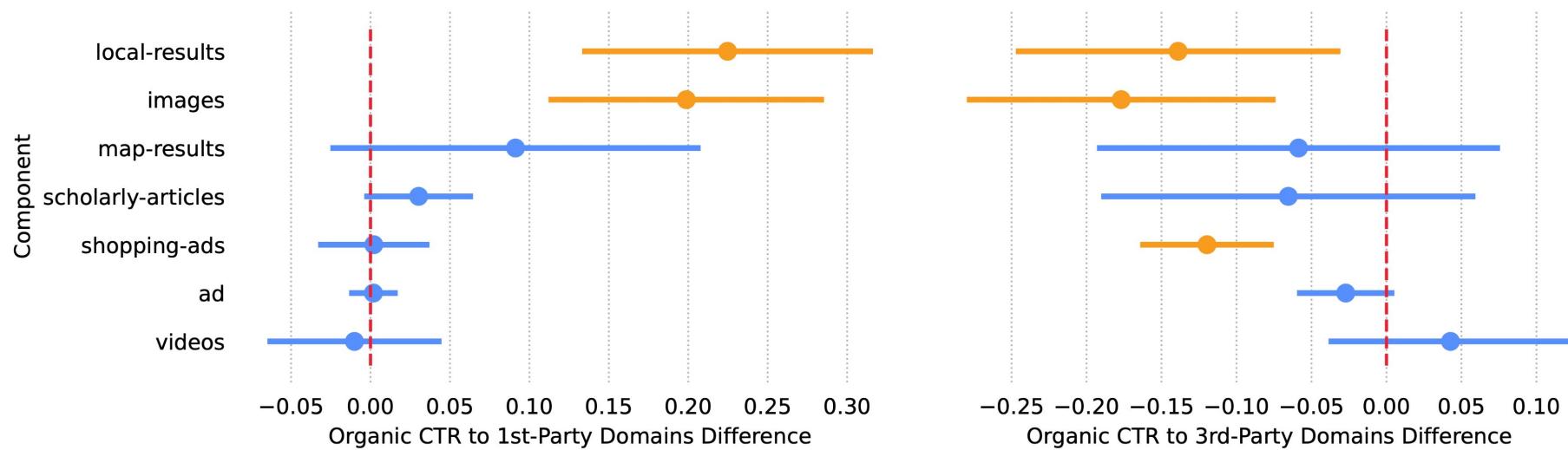


# Results: Effects of Google Services (RQ2)

**Shopping-ads decrease organic CTR to 3rd-parties by -12.0 pp.**



# Results: Effects of Google Services (RQ2)



## Discussion: Google Services (RQ2)

- *Digital Markets Act* makes self-preferencing illegal in the EU

## Discussion: Google Services (RQ2)

- *Digital Markets Act* makes self-preferencing illegal in the EU
- Proposed US legislation: *American Innovation and Choice Online Act*

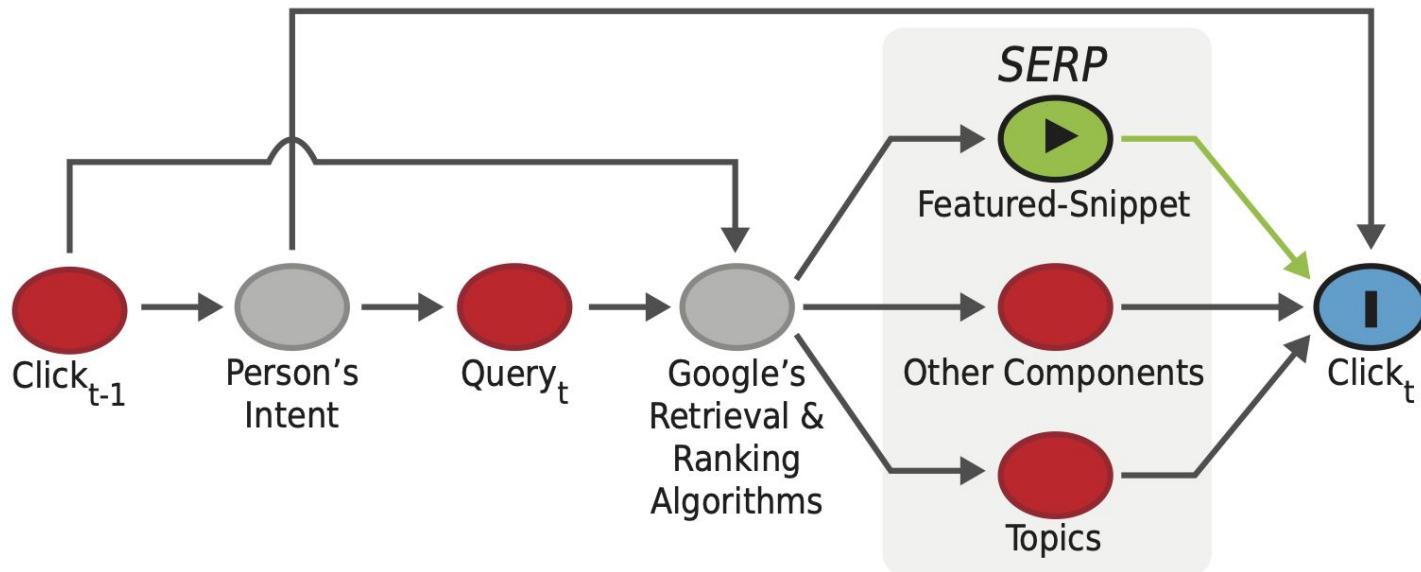
# Thank you!

Questions: [gleason.je@northeastern.edu](mailto:gleason.je@northeastern.edu)

Paper and Code: <https://jlgleason.github.io>



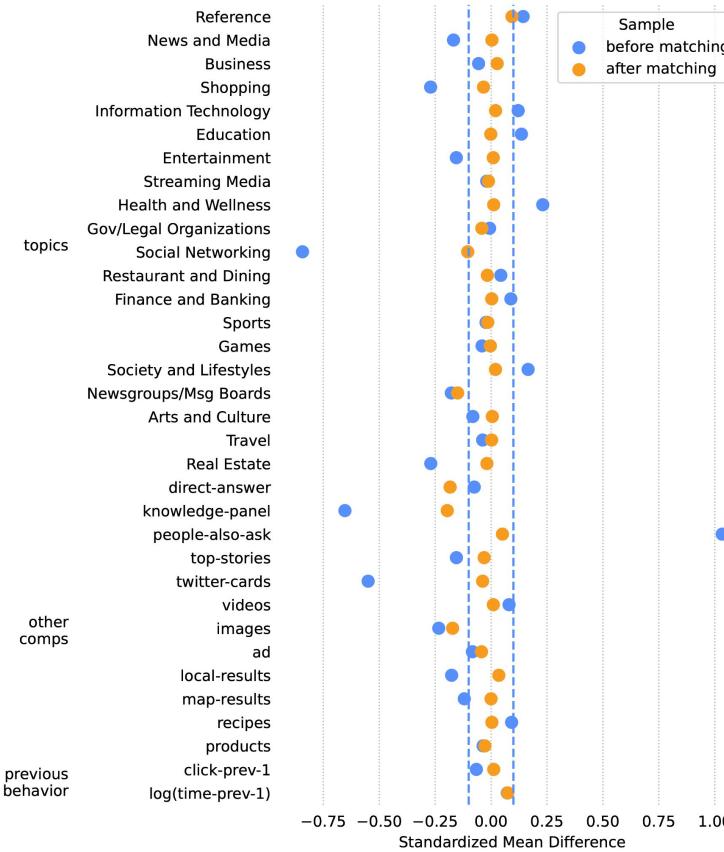
# Method: Causal DAG



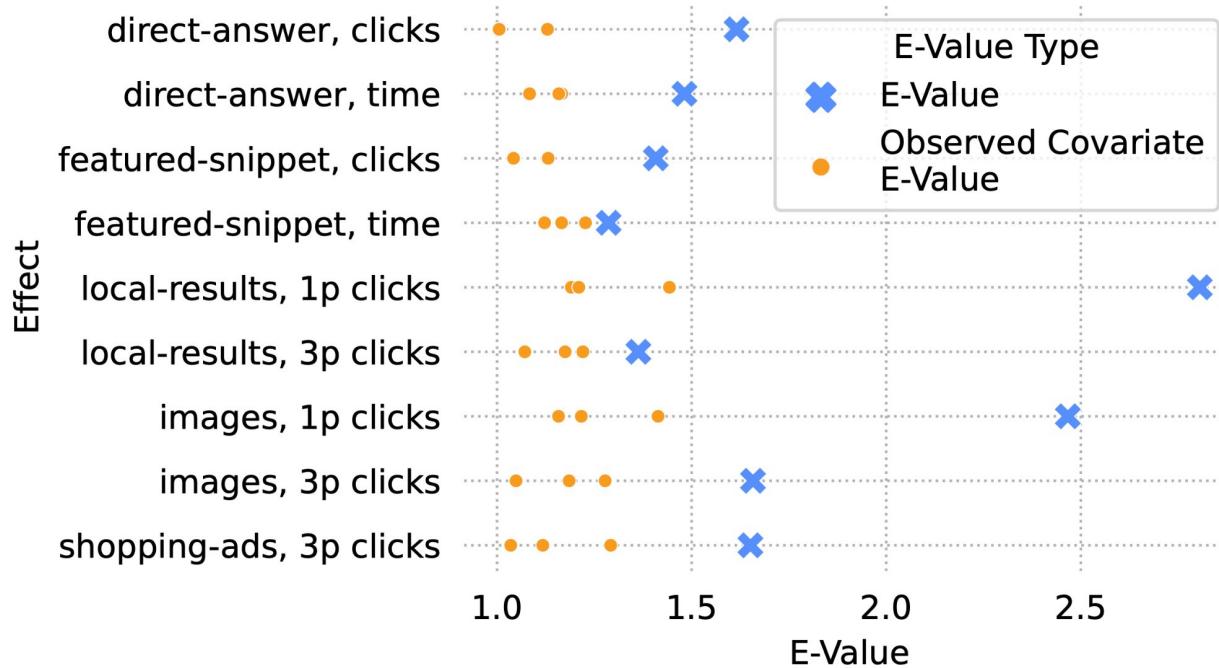
# Method: Matching Evaluation

	<b>Component</b>	<b>Cosine Similarity</b>	<b>Mean</b>	<b>Matches Retained</b>
Extracted Results	featured-snippet		0.92	3330 (.04)
	knowledge-panel		0.92	1557 (.03)
	top-stories		0.94	1057 (.06)
	top-image-carousel		0.96	915 (.09)
	direct-answer		0.92	345 (.01)
Google Services	ad		0.95	2223 (.06)
	shopping-ads		0.93	1090 (.03)
	local-results		0.90	306 (.05)
	videos		0.93	300 (.02)
	images		0.91	170 (.02)
	map-results		0.90	127 (.03)
	scholarly-articles		0.91	126 (.05)

# Method: Additional Confounders



# Results: Sensitivity Analysis



<b>Demographic Variable</b>		<b>Frequency</b>
<b>Age</b>	18 - 24	13.6
	25 - 44	42.2
	45 - 64	30.3
	65+	13.9
<b>Gender</b>	Male	51.5
	Female	48.5
<b>Race/Ethnicity</b>	White	74.1
	Black	8.4
	Asian	6.8
	Latino	6.8
<b>Education</b>	Four-year degree or higher	54.6
	Less than a four-year degree	45.4
<b>Income</b>	Under \$50,000	47.3
	\$50,000 - \$99,999	30.9
	\$100,000 - \$149,999	12.5
	\$150,000 - \$199,999	4.8
	\$200,000 and over	4.4
<b>Political Party</b>	Democrat	54.8
	Independent/Other	30.8
	Republican	14.4

Table 1: Participant Demographics