

# Effects of human and machine translations on website engagement

Geza Kovacs  
John DeNero



# Research Questions

Does localizing a website with professional translators improve engagement, vs showing MT or English?

Should we show translations (human or MT) by default, or show English by default with a language switcher?

If we show users English, do users end up using their browser's built-in machine translation?

# Methodology

Ran an A/B test on 2 websites ( [unetbotin.github.io](https://unetbotin.github.io) and [habitlab.github.io](https://habitlab.github.io) - both are open-source projects I built).

3,332,669 sessions total from 190 countries. Both websites localized into 15+ languages.

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The screenshot shows the homepage of the UNetbootin website. The title "UNetbootin" is at the top center. Below it is a navigation bar with links: Features, Using, Supported Distributions, FAQs, License, and Wiki. There are three large download buttons: "Download (Windows)" with a Windows icon, "Download (Linux)" with a Linux icon, and "Download (macOS)" with a macOS icon. Below these are three donation buttons: "P Donate via Paypal", "B Donate via Bitcoin", and "V Donate via Venmo". A descriptive text block states: "UNetbootin allows you to create bootable Live USB drives for Ubuntu and other Linux distributions without burning a CD. You can either let UNetbootin download one of the many distributions supported out-of-the-box for you, or supply your own Linux .iso file." A section titled "Features" highlights the ability to create bootable Live USB drives and download ISO files. At the bottom is a screenshot of the UNetbootin software interface showing a list of distributions like Fedora, FreeBSD, and Gentoo. The footer includes a language selection "English ▾", a helpfulness rating scale, and a link to the Chinese version.

UNetbootin

Features Using Supported Distributions FAQs License Wiki

Download (Windows) Download (Linux) Download (macOS)

[P Donate via Paypal](#) [B Donate via Bitcoin](#) [V Donate via Venmo](#)

UNetbootin allows you to create bootable Live USB drives for Ubuntu and other Linux distributions without burning a CD.  
You can either let UNetbootin download one of the many [distributions supported out-of-the-box](#) for you, or [supply your own Linux .iso file](#).

## Features

UNetbootin can create a bootable [Live USB drive](#)  
It loads distributions either by downloading a ISO (CD image) files for you, or by [using an ISO file you've already downloaded](#).

UNetbootin

Distribution: Fedora  
Homepage: <http://fedoraproject.org>  
Description: Fedora is a...  
Install Notes: The Live v...  
FreeBSD  
FreeDOS  
FreeNAS  
Frugalware  
F-Secure Rescue CD  
Gentoo  
gNewSense

Was this page helpful? ★ ★ ★ ★ ★ 中文 (简体)

# Methodology

Ran an A/B test on 2 websites ( [unetbotin.github.io](https://unetbotin.github.io) and [habitlab.github.io](https://habitlab.github.io) - both are open-source projects I built).

3,332,669 sessions total from 190 countries. Both websites localized into 15+ languages.



# Methodology

Randomized visitors with a non-English preferred language (1,243,157 sessions) into one of five conditions:

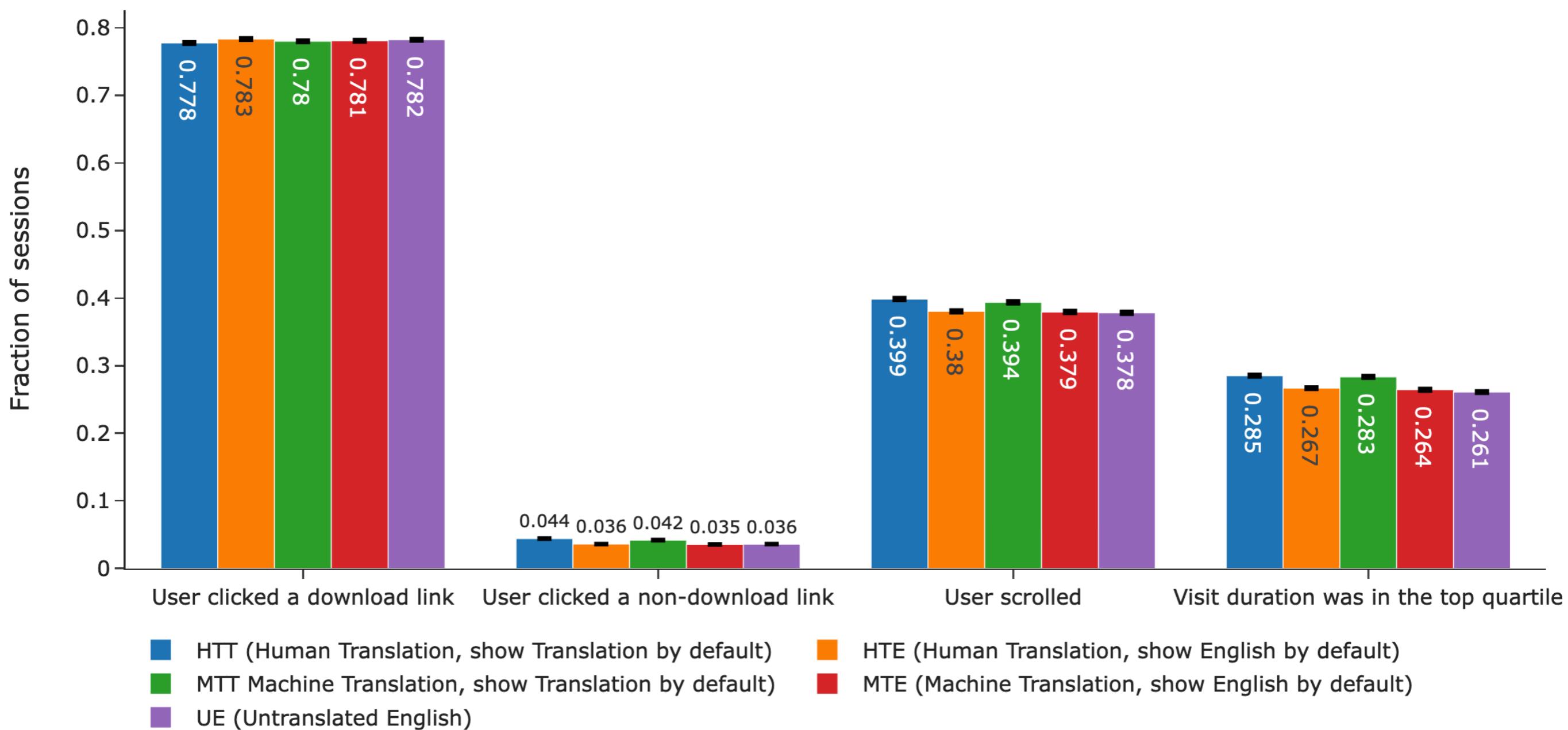
- UE: Untranslated English
- HTT: Human Translation, show Translation by default
- HTE: Human Translation, show English by default
- MTT: Machine Translation, show Translation by default
- MTE: Machine Translation, show English by default

# Methodology

Tracked effects of the 5 different ways of presenting translations on the following engagement metrics:

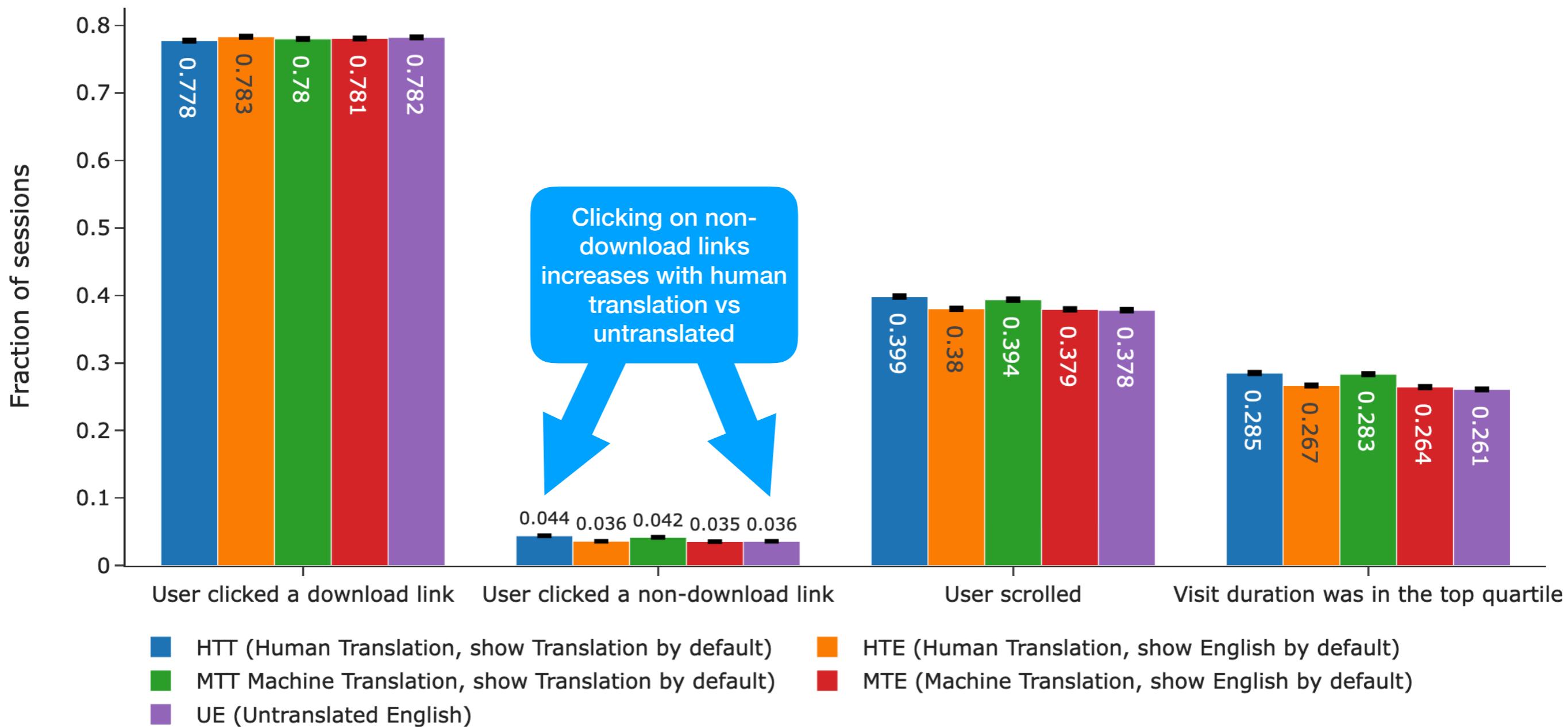
- Downloads
- Clicking non-download links
- Scrolling
- Visit duration being in the top quartile (  $\geq 17$  seconds )

# Effects of showing human and machine translations on website engagement (Site 1)



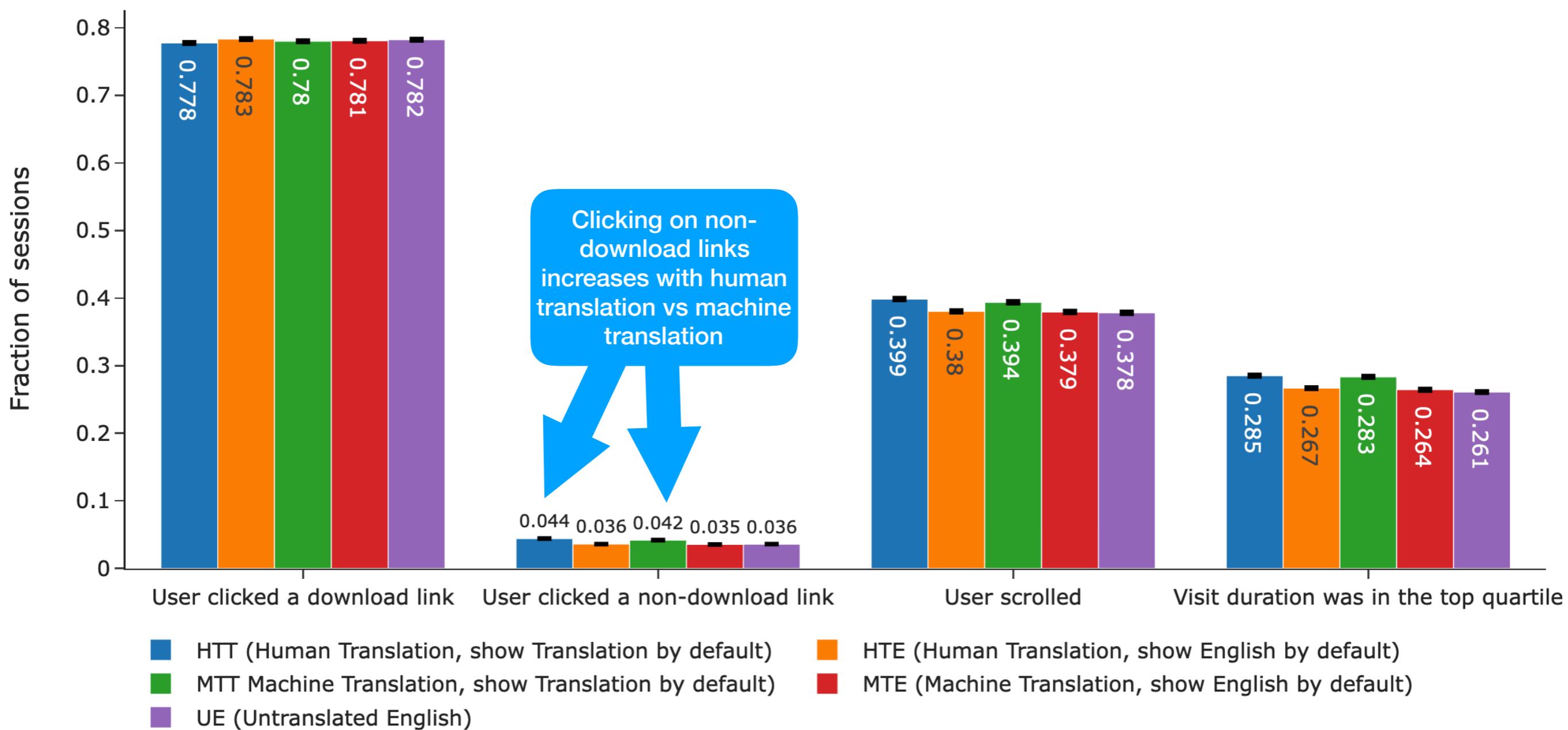
Metric	HTT vs UE	HTT vs MTT	MTT vs UE
Download link clicked	$\chi^2 = 14.25, p = 0.0002$	$\chi^2 = 4.190, p = 0.041$	$\chi^2 = 2.968, p = 0.085$
Non-download link clicked	$\chi^2 = 191.9, p < 0.0001$	$\chi^2 = 13.60, p = 0.0002$	$\chi^2 = 103.2, p < 0.0001$
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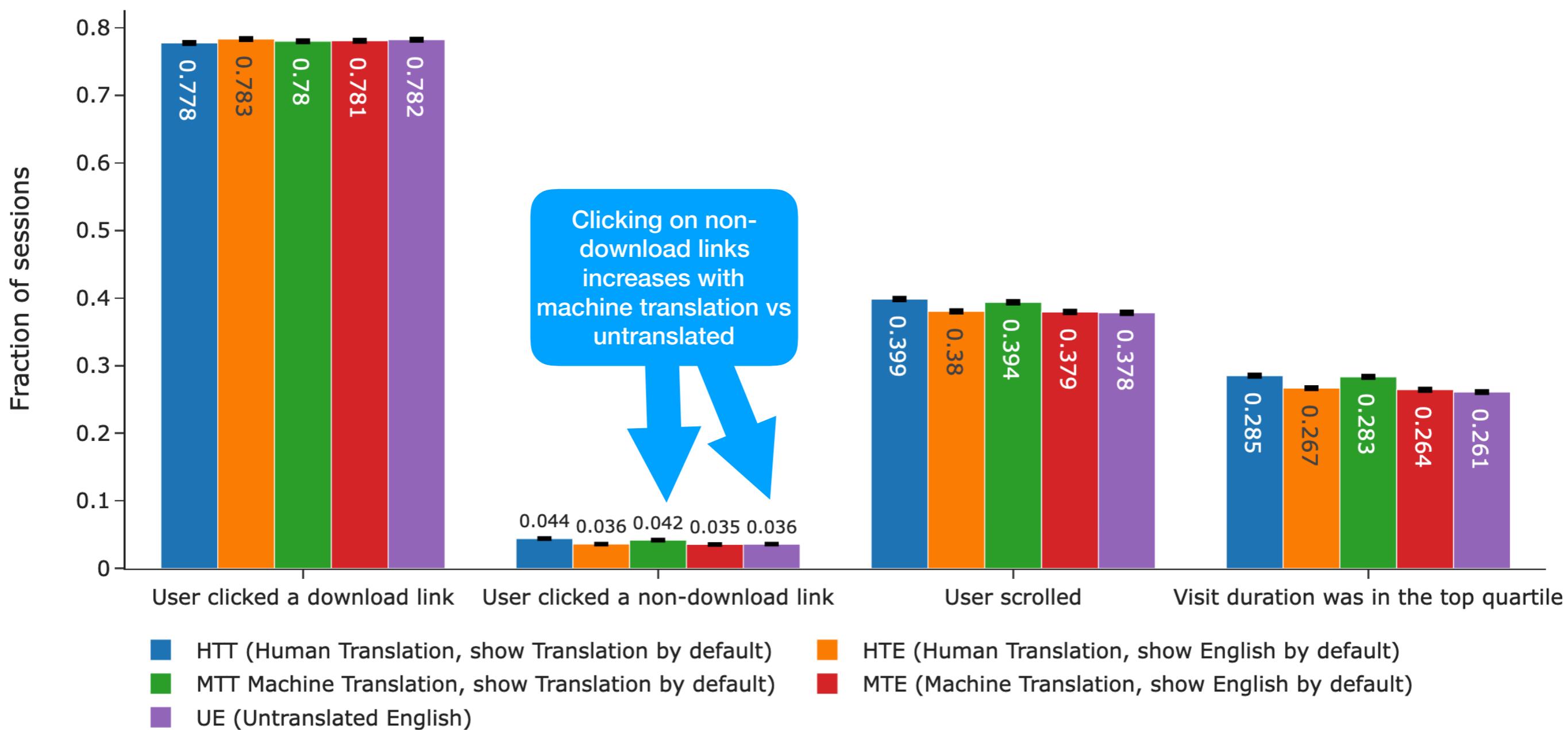
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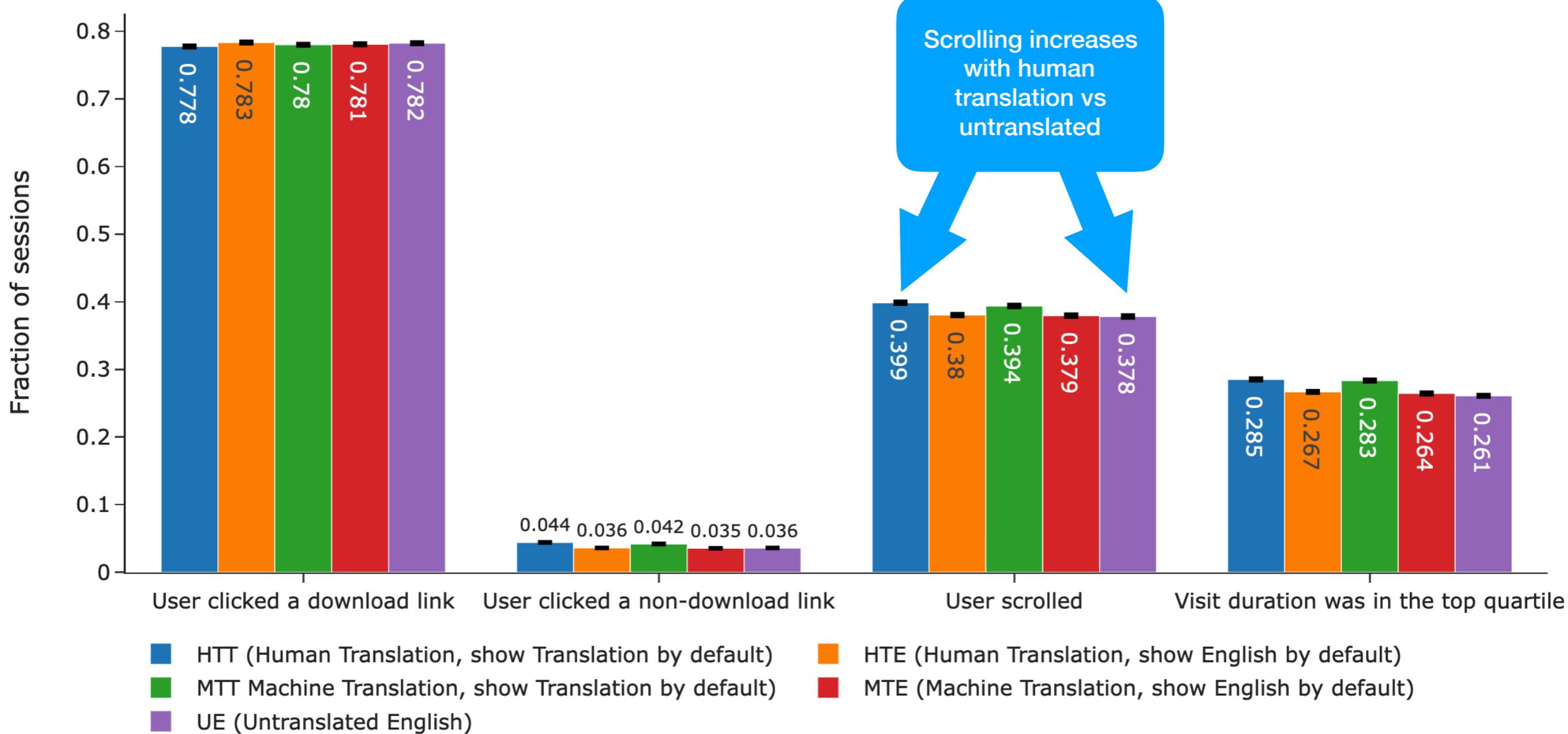
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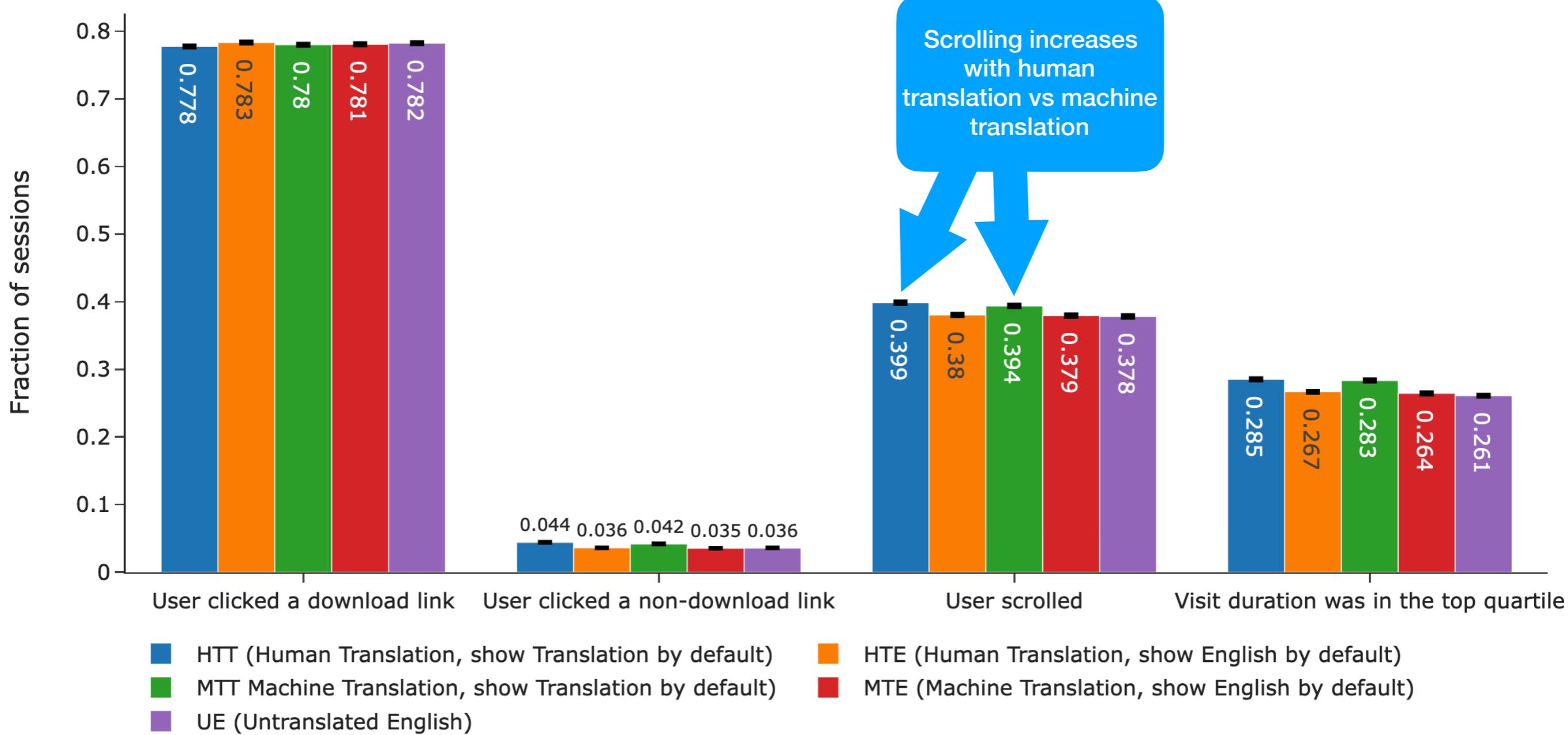
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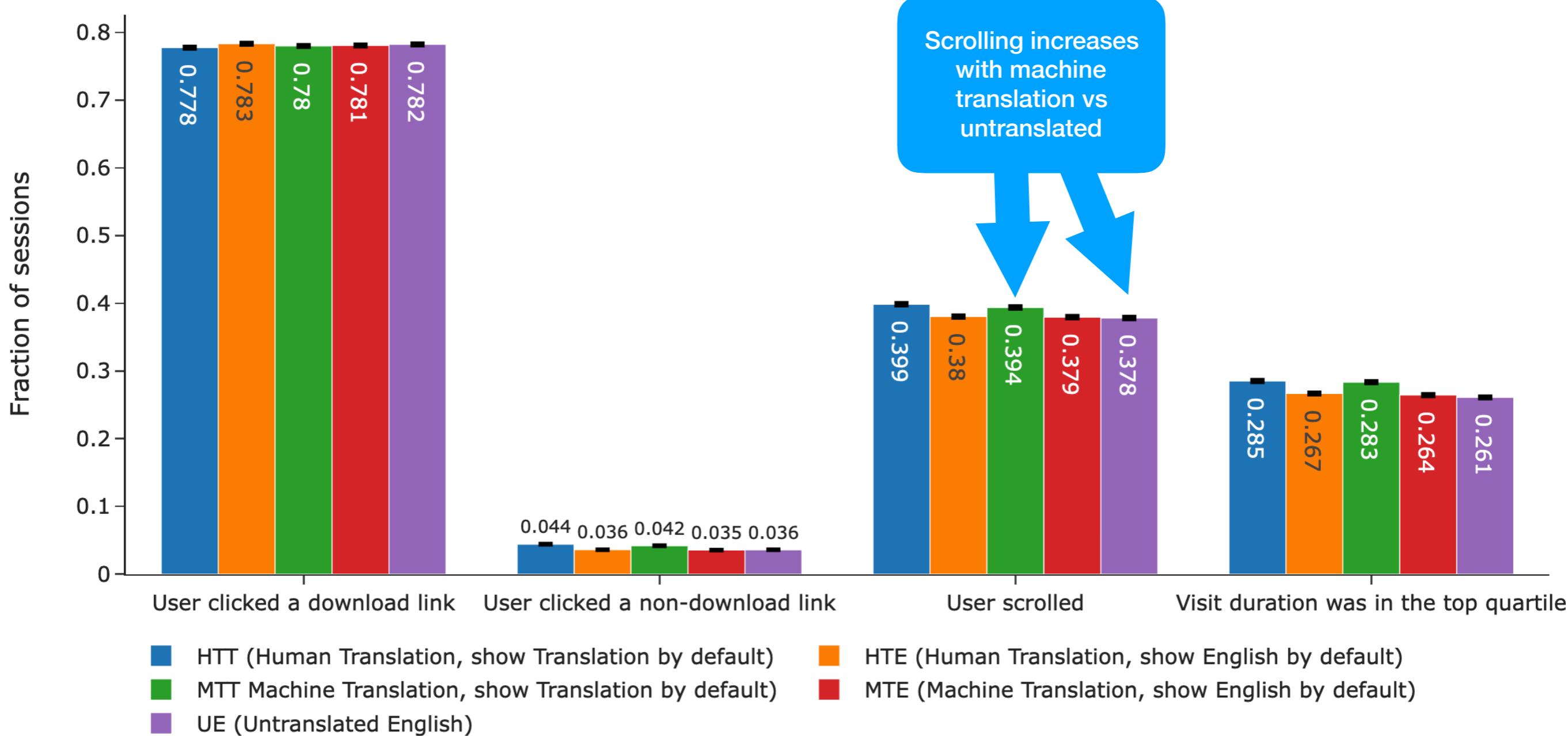
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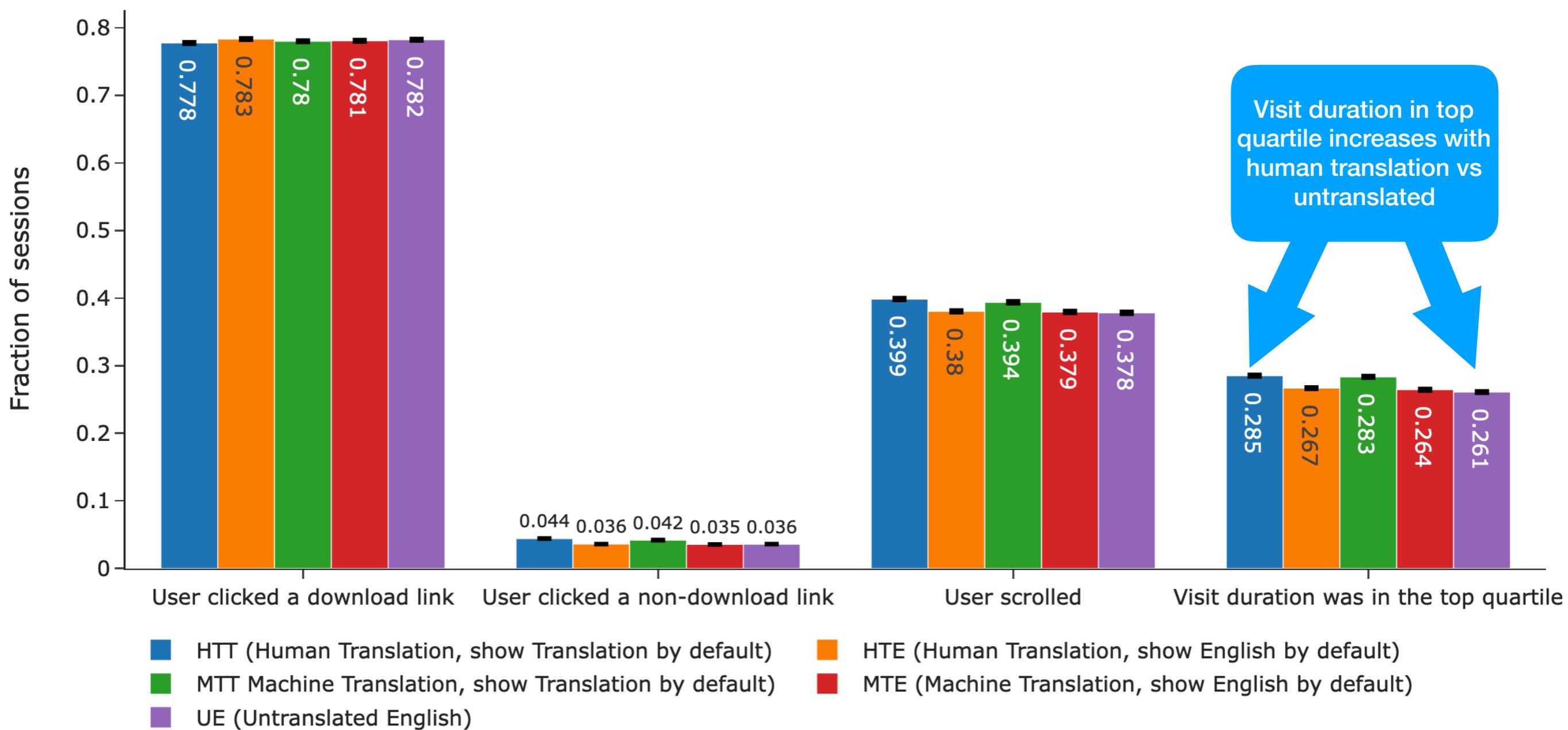
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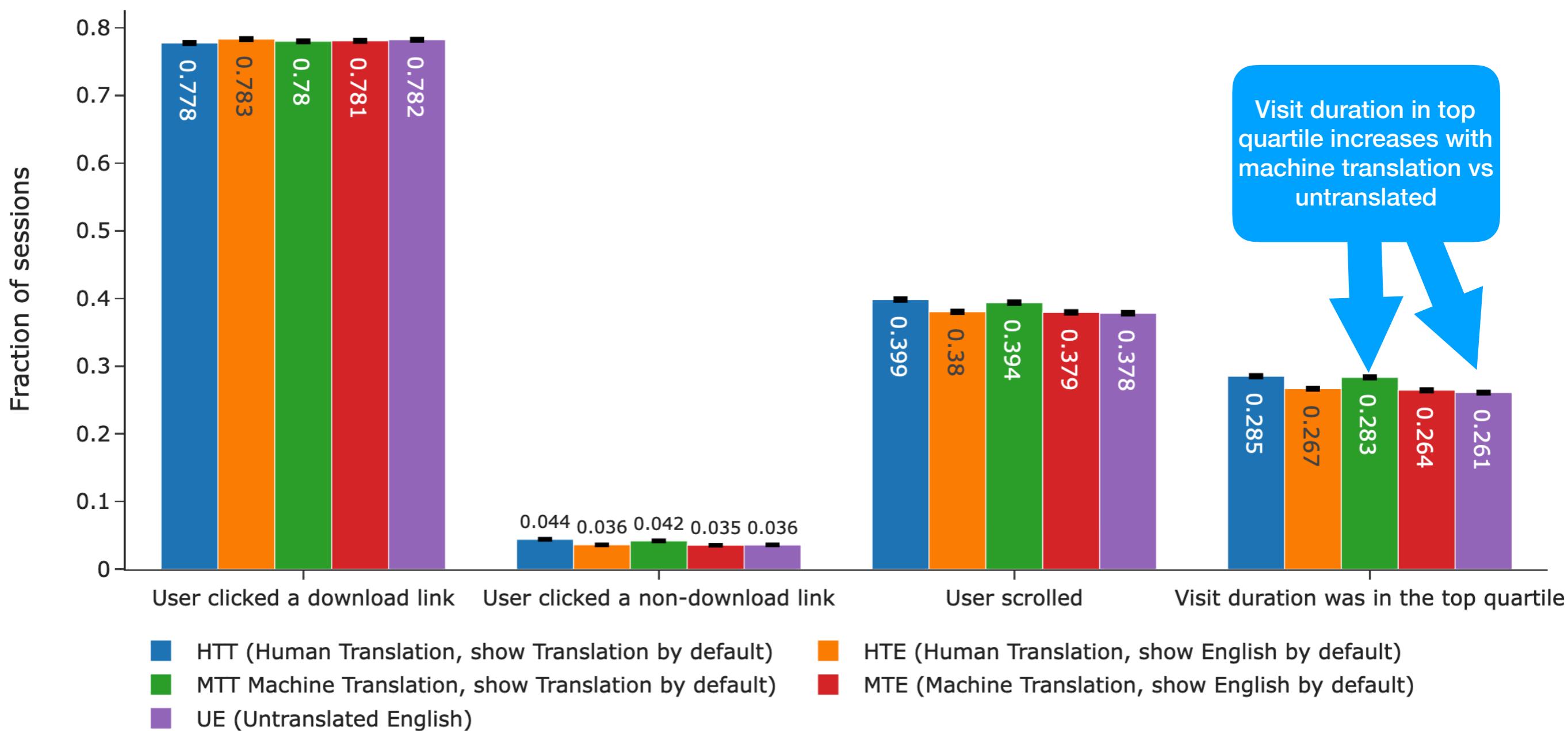
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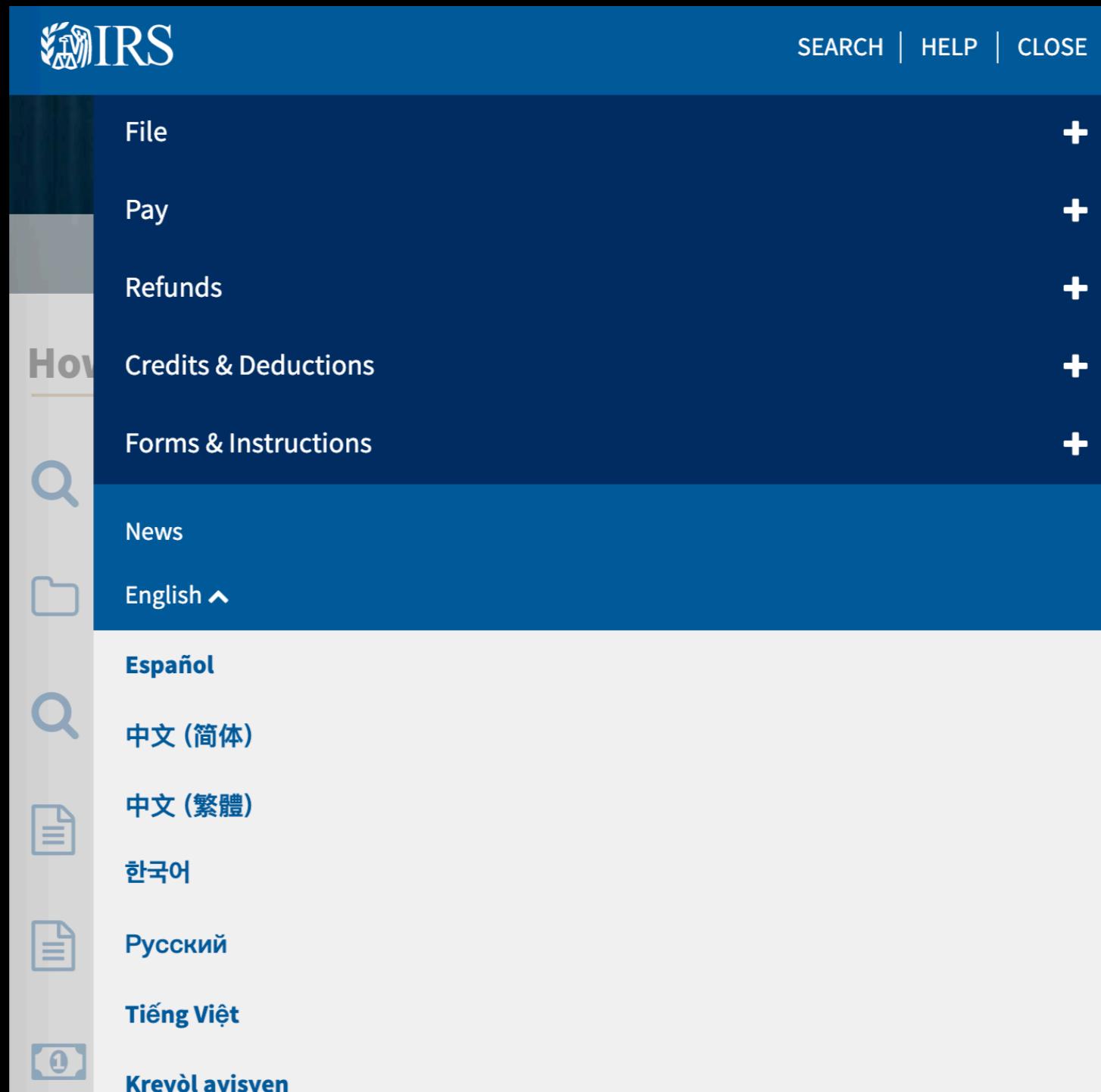
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- Showing human translations or MT both increase engagement, compared to showing English
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# Should we show translations (human or MT) by default, or show English by default with a language switcher?

- Many webpages ignore browser preferences, show English by default, and require the user to manually switch languages



Should we show translations (human or MT) by default, or show English by default with a language switcher?

- Many webpages ignore browser preferences, show English by default, and require the user to manually switch languages
- Do users switch languages? How does requiring the user to manually switch languages affect engagement?

Randomized visitors with a non-English preferred language (1,243,157 sessions) into one of five conditions:

- UE: Untranslated English
- HTT: Human Translation, show Translation by default
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# HTE: Human Translation, show English by default

## UNetbootin

Features   Using   Supported Distributions   FAQs   License   Wiki

 Download (Windows)    Download (Linux)    Download (macOS)

 [Donate via Paypal](#)    [Donate via Bitcoin](#)    [Donate via Venmo](#)

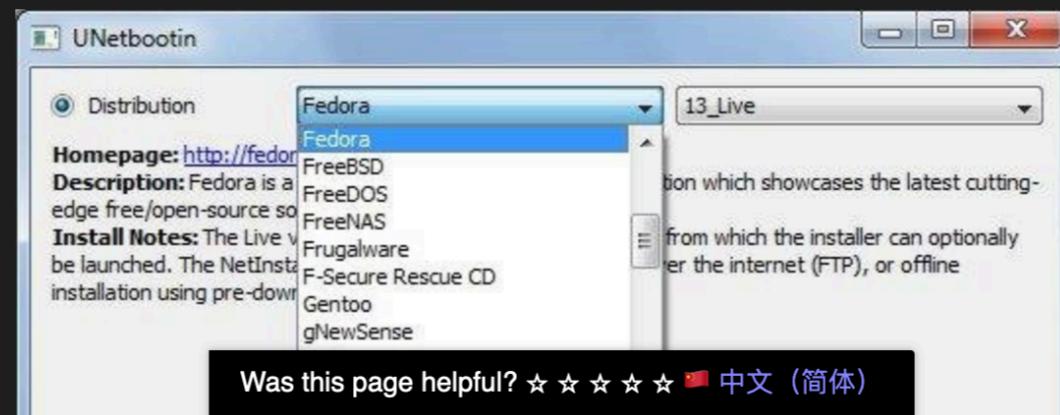
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# HTE: Human Translation, show English by default

Language switcher



# HTT: Human Translation, show Translation by default



改善你的上网习惯



把HabitLab添加至Chrome



HabitLab安卓版本

العربية

Čeština

Deutsch

Ελληνικά

English

Español

Français

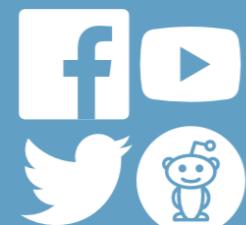
Italiano

Nederlands

Polski

Português

Русский



确立目标

选择你要减少哪些网站的使用



尝试工具

每次访问, HabitLab会显示不同的工具



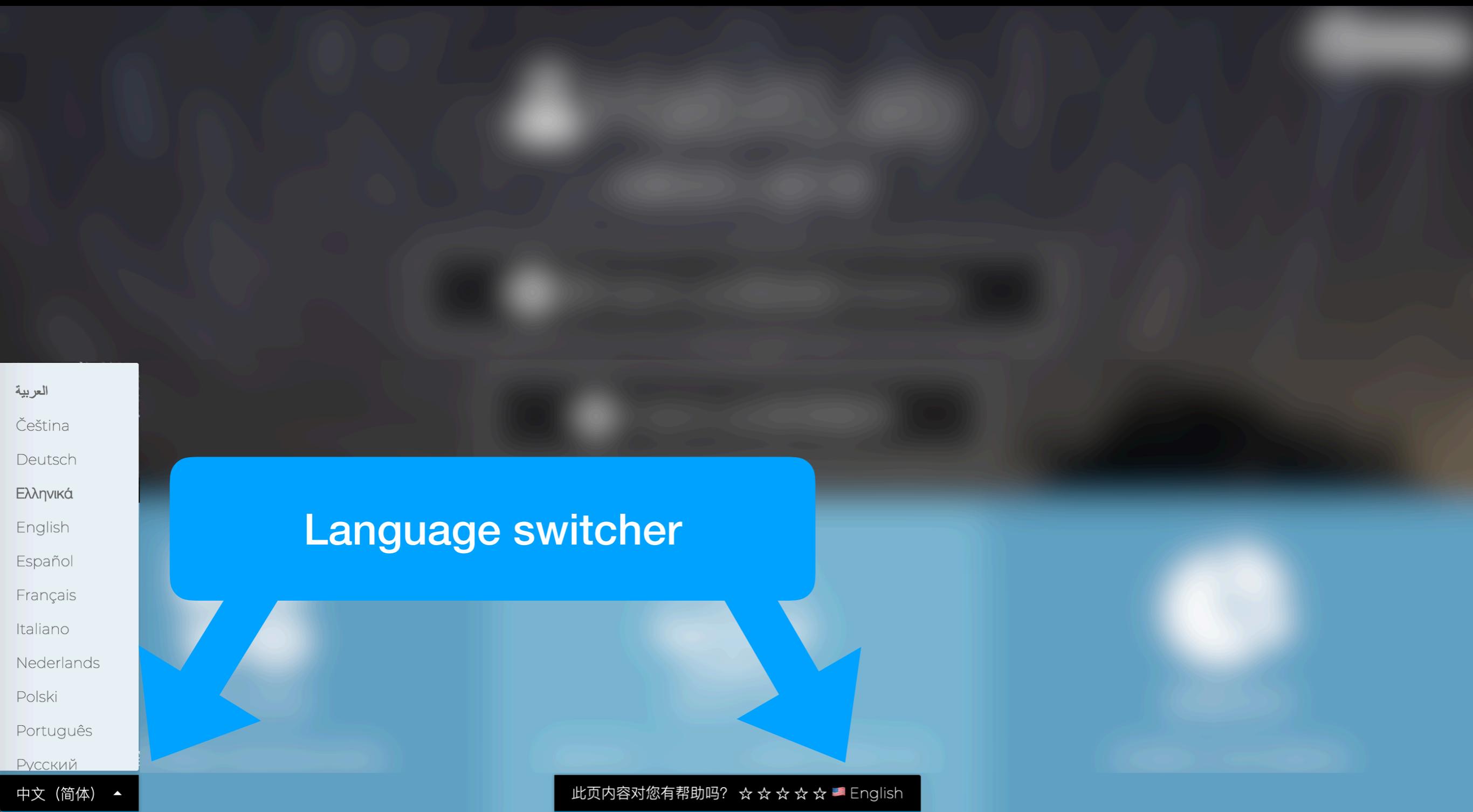
查看进步

发现哪些工具对你最有效

此页内容对您有帮助吗? ☆☆☆☆ English

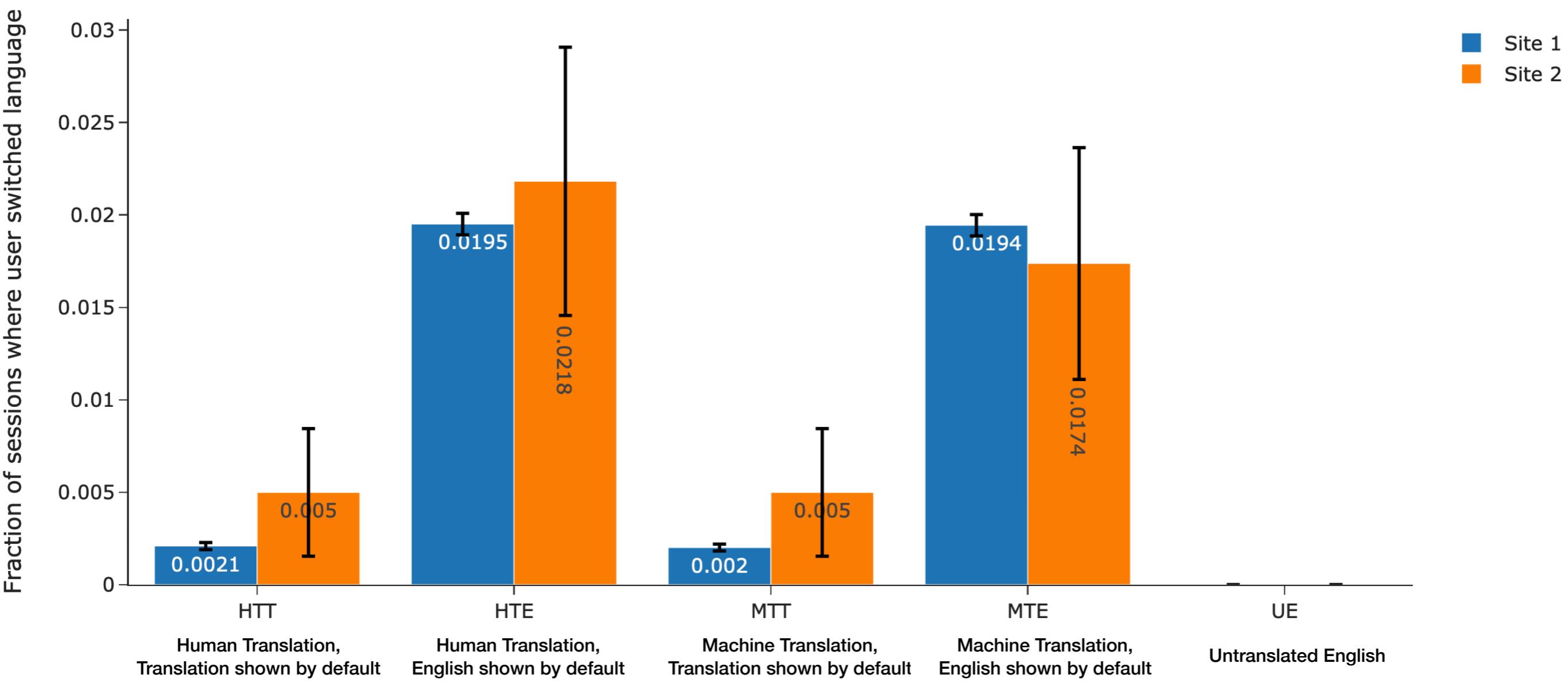
中文 (简体) ▾

# HTT: Human Translation, show Translation by default



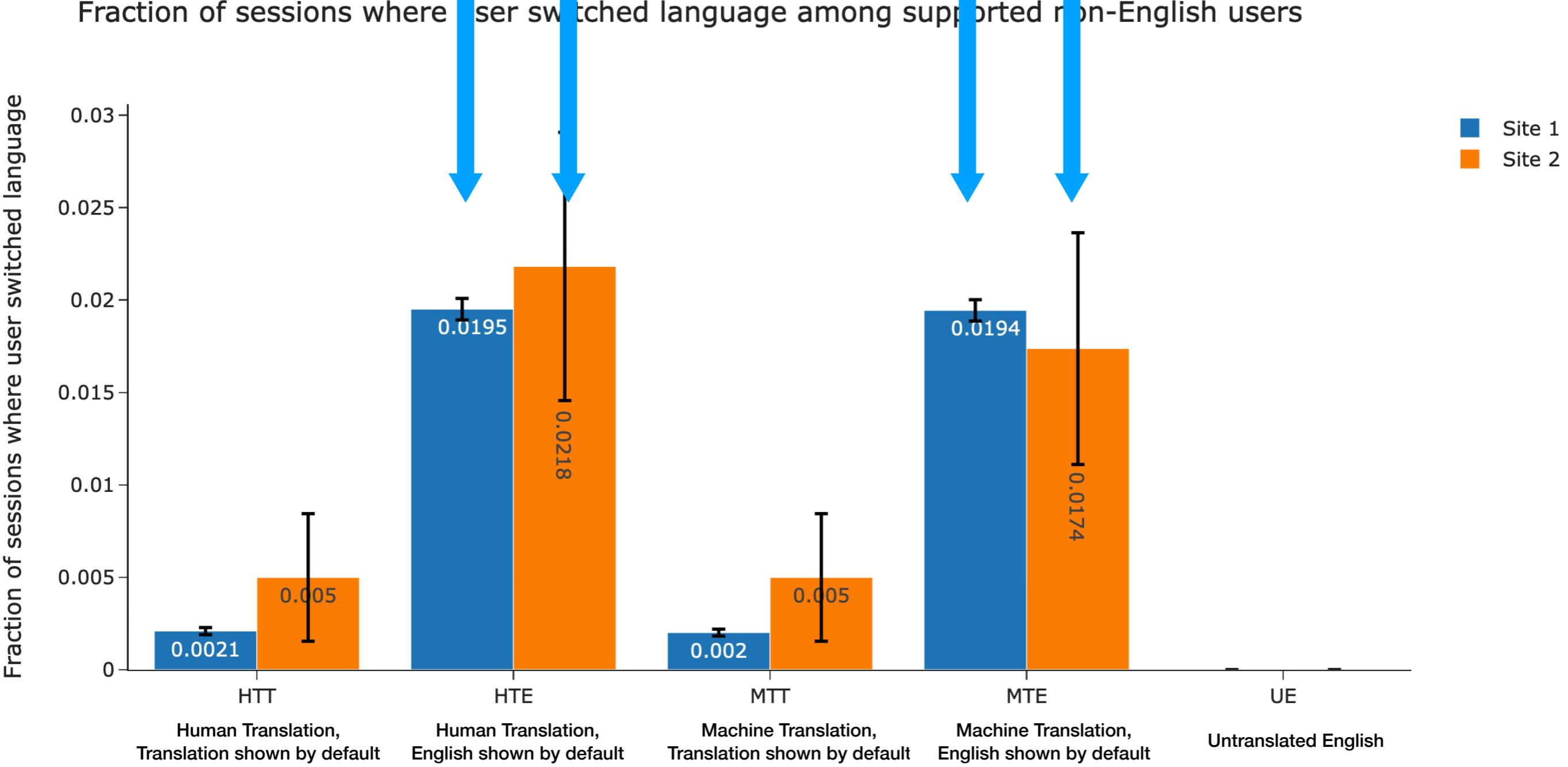
# Language switcher use

Fraction of sessions where user switched language among supported non-English users



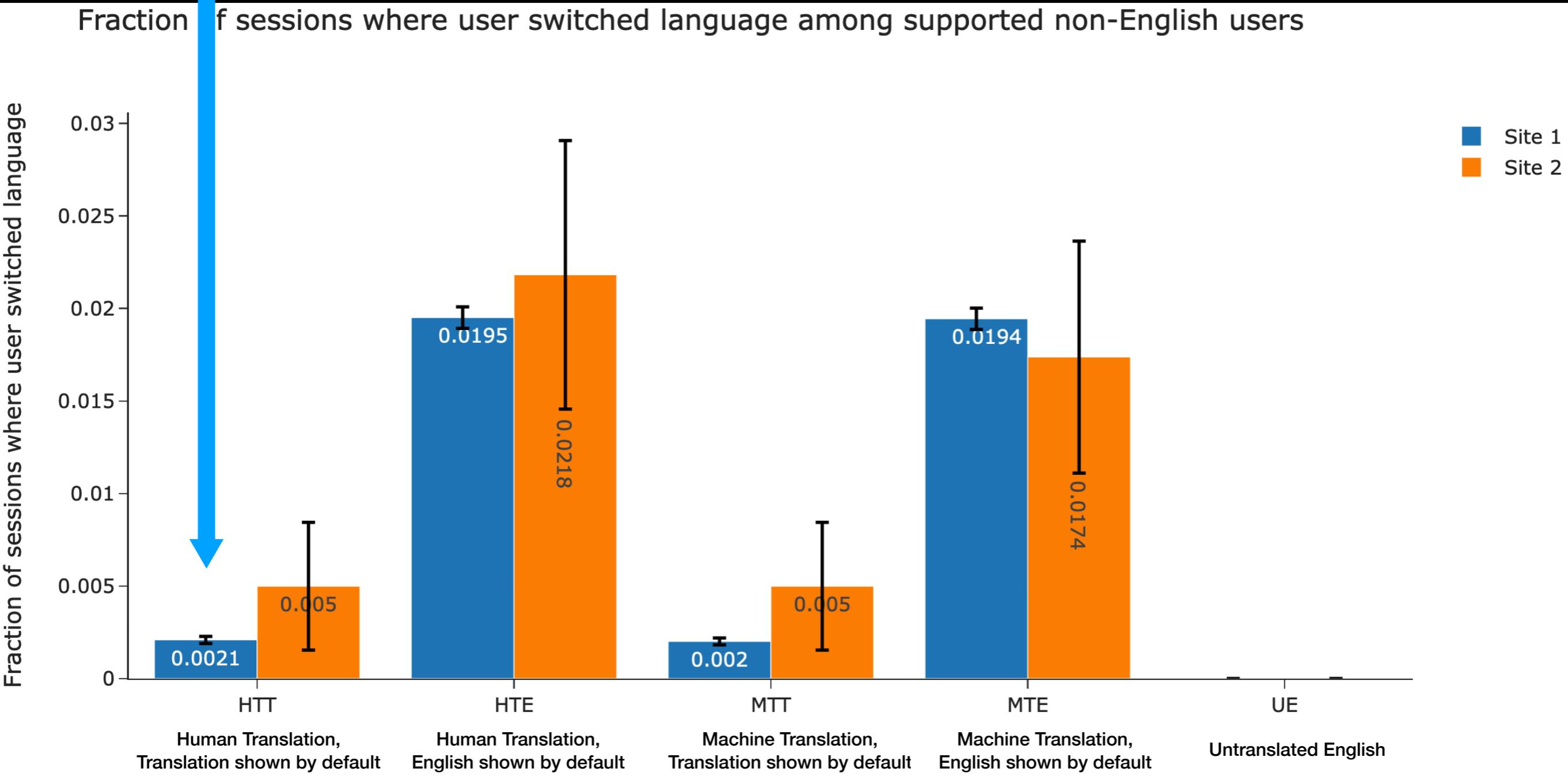
# Language switcher use

If showing English by default, only 2% switch to a translation



# Language switcher use

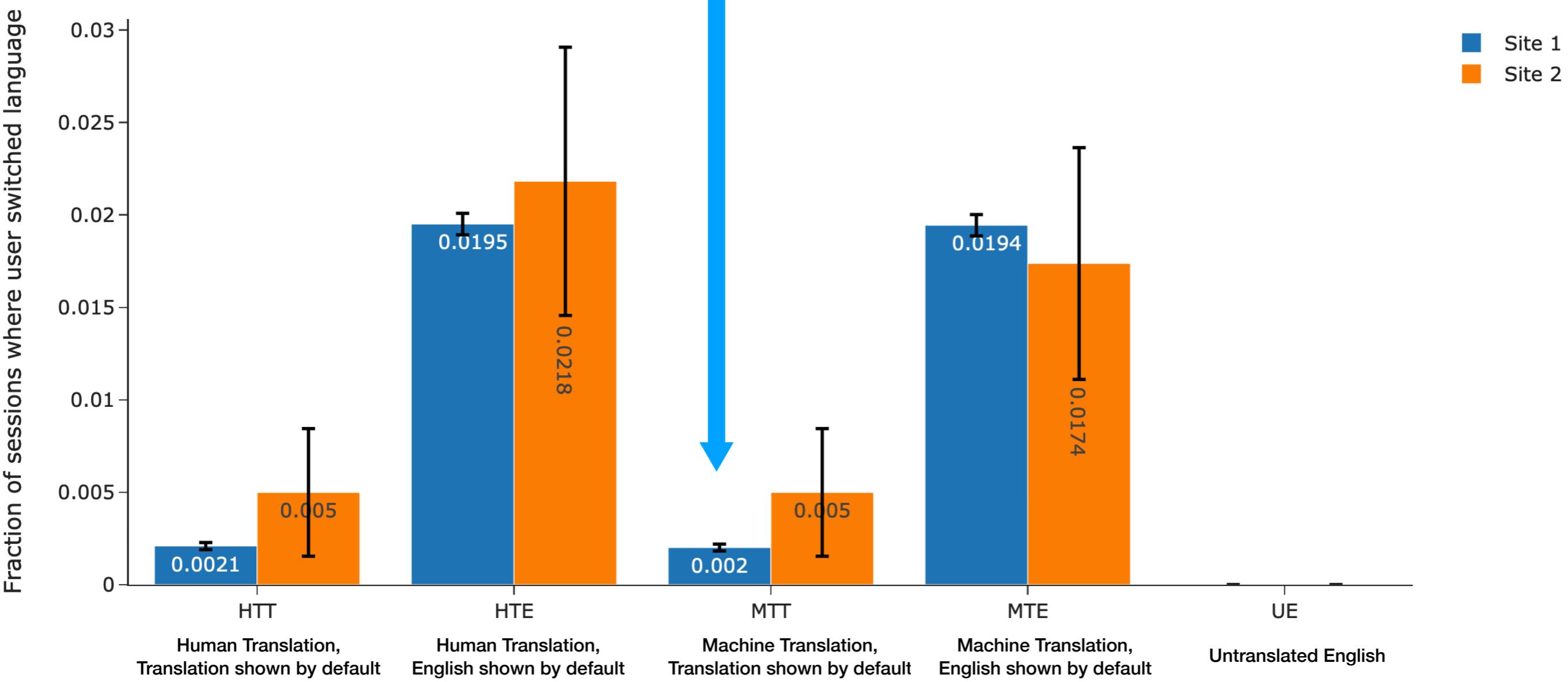
If showing a human translation by default, only 0.2% switch to English



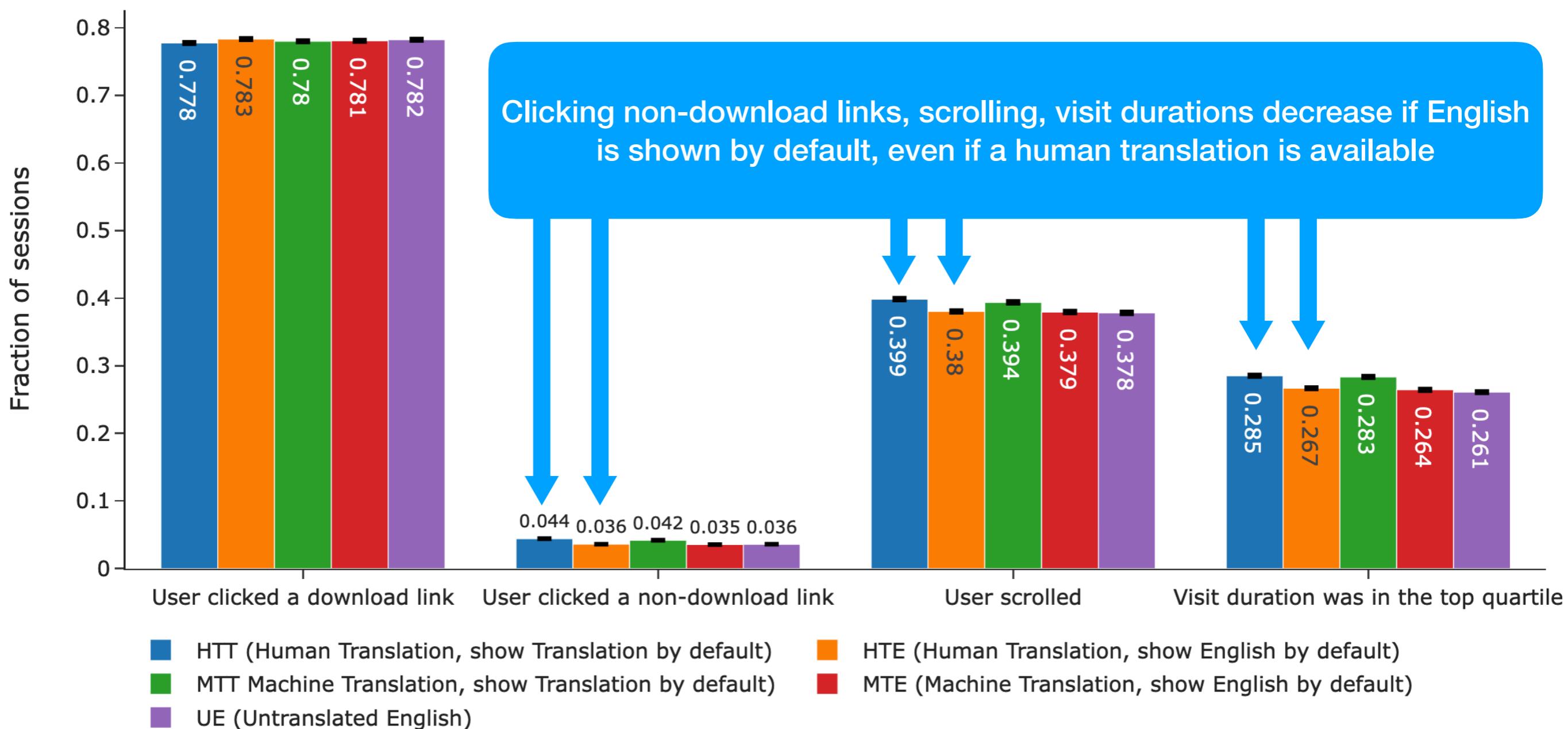
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If showing a machine translation by default, only 0.2% switch to English

Fraction of sessions where user switched language among supported non-English users

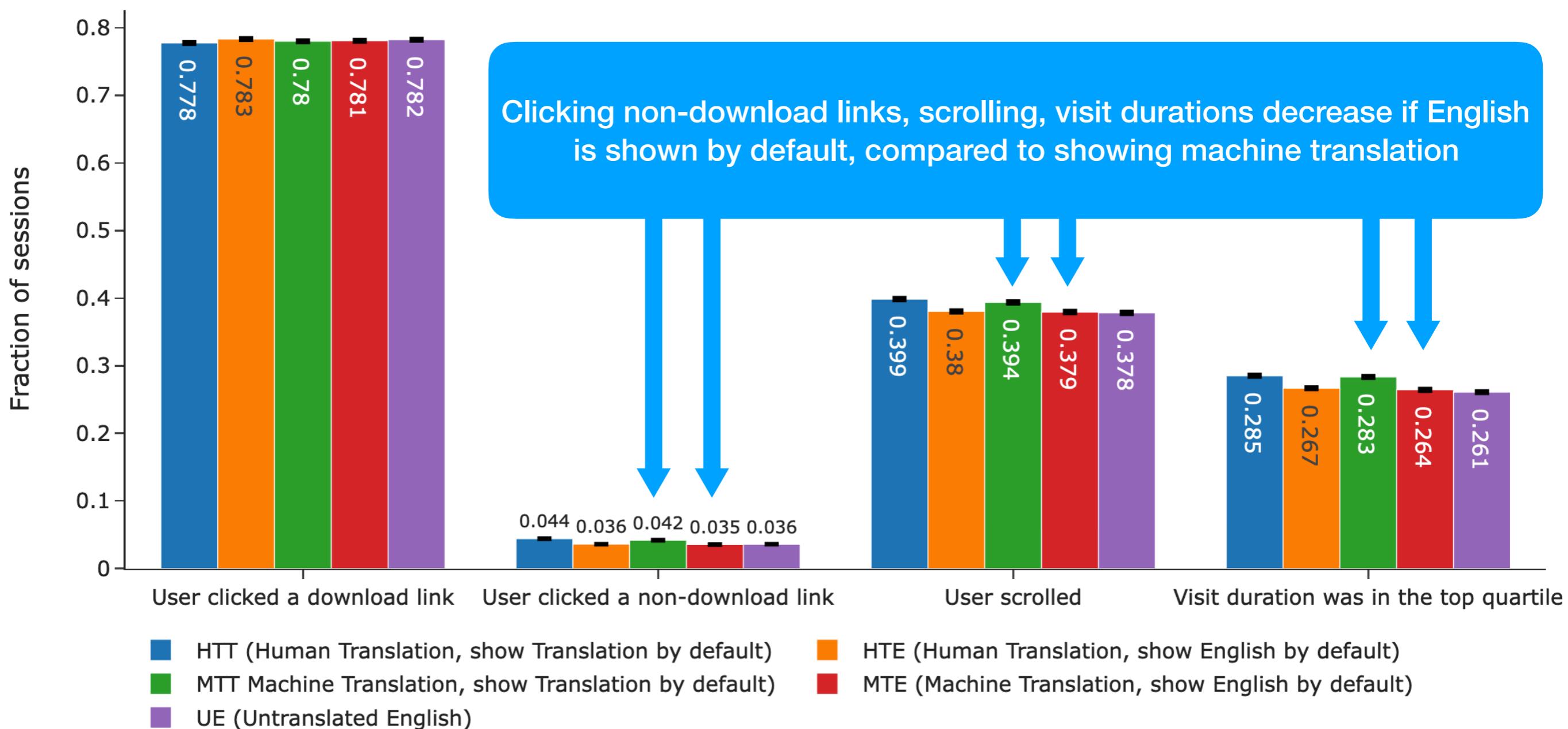


# Effects of showing human and machine translations on website engagement (Site 1)



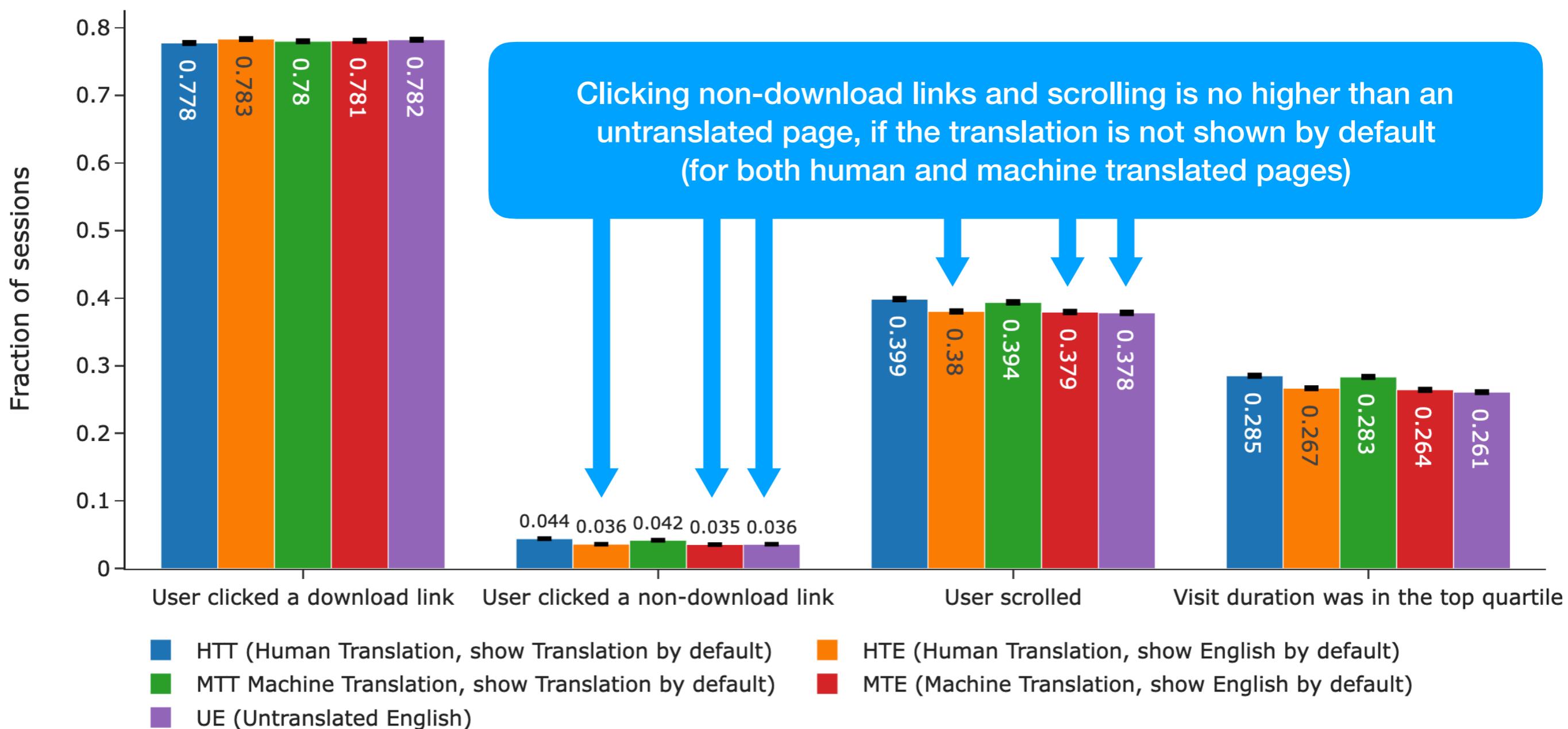
Metric	HTT vs HTE	MTT vs MTE	HTE vs UE	MTE vs UE
Download link clicked	$\chi^2 = 21.13, p < 0.0001$	$\chi^2 = 0.285, p = 0.594$	$\chi^2 = 0.679, p = 0.410$	$\chi^2 = 1.409, p = 0.235$
Non-download link clicked	$\chi^2 = 180.3, p < 0.0001$	$\chi^2 = 118.8, p < 0.0001$	$\chi^2 = 0.155, p = 0.694$	$\chi^2 = 0.539, p = 0.463$
User scrolled	$\chi^2 = 152.8, p < 0.0001$	$\chi^2 = 94.31, p < 0.0001$	$\chi^2 = 2.028, p = 0.154$	$\chi^2 = 0.737, p = 0.391$
Visit duration $\geq 17$ seconds	$\chi^2 = 185.2, p < 0.0001$	$\chi^2 = 198.6, p < 0.0001$	$\chi^2 = 18.33, p < 0.0001$	$\chi^2 = 6.548, p = 0.010$

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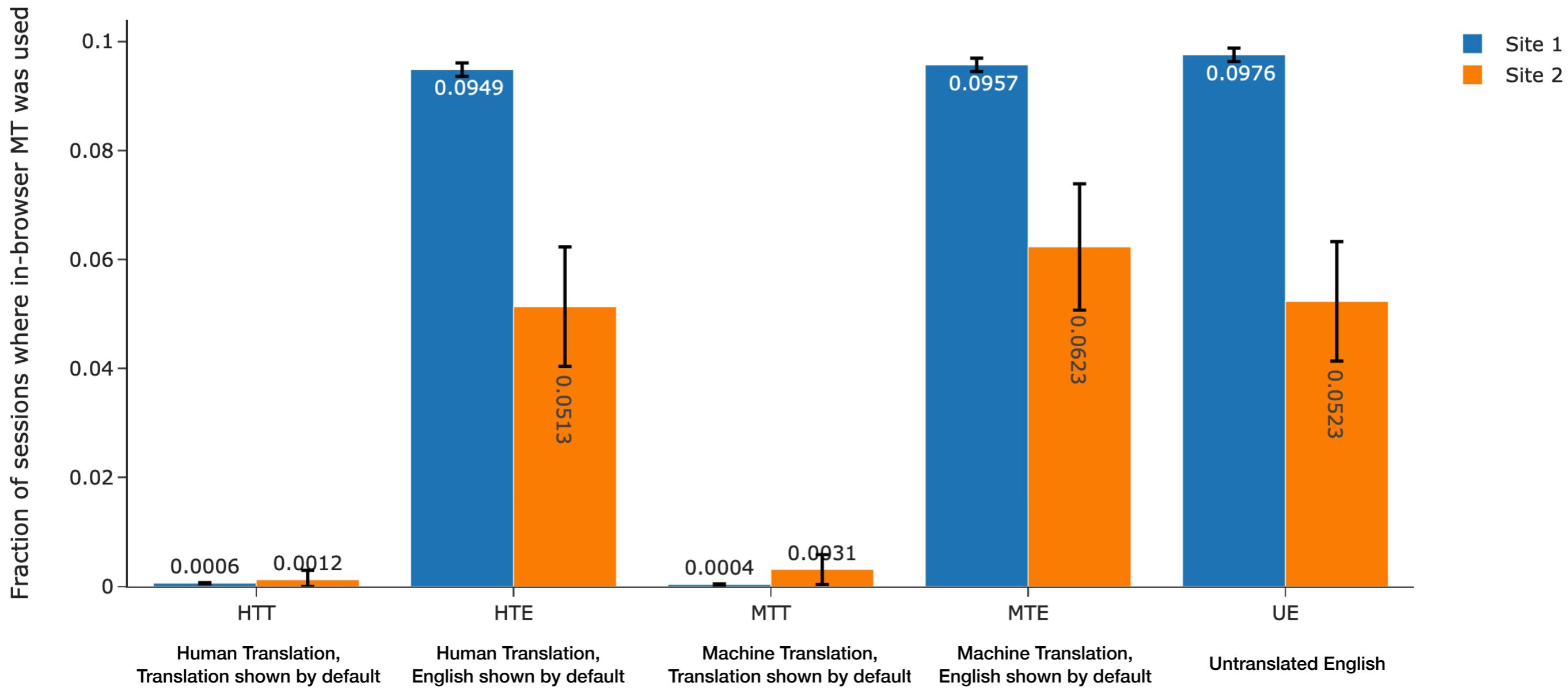
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Should we show translations (human or MT) by default, or show English by default with a language switcher?

- Users switch 10x more in the English -> Translation direction (~2% of sessions) than the reverse direction (only ~0.2% switch from machine translation to English)
- If showing English by default, engagement is significantly lower than if showing a translation (human or MT) by default

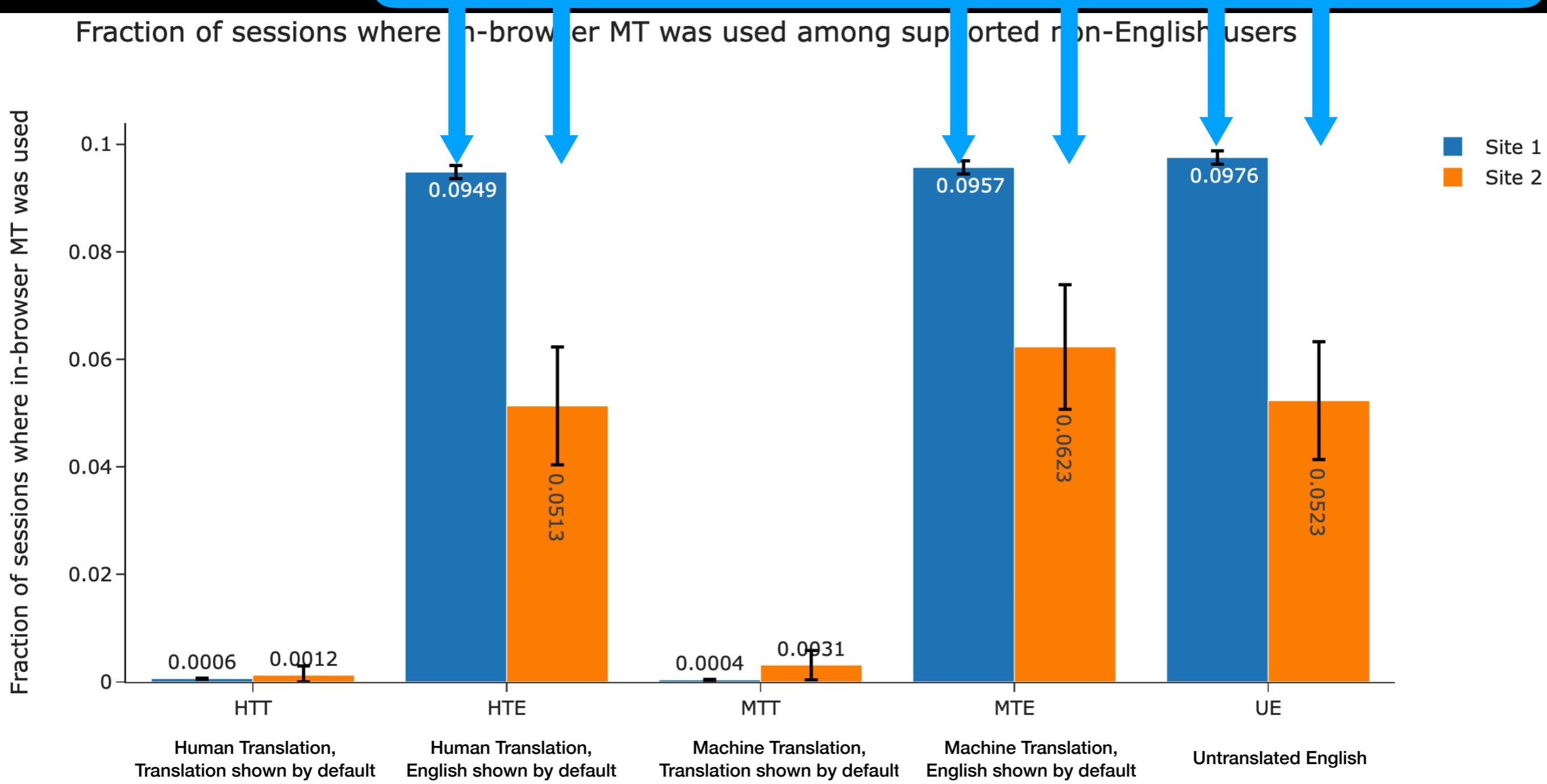
# In-browser machine translation use

Fraction of sessions where in-browser MT was used among supported non-English users



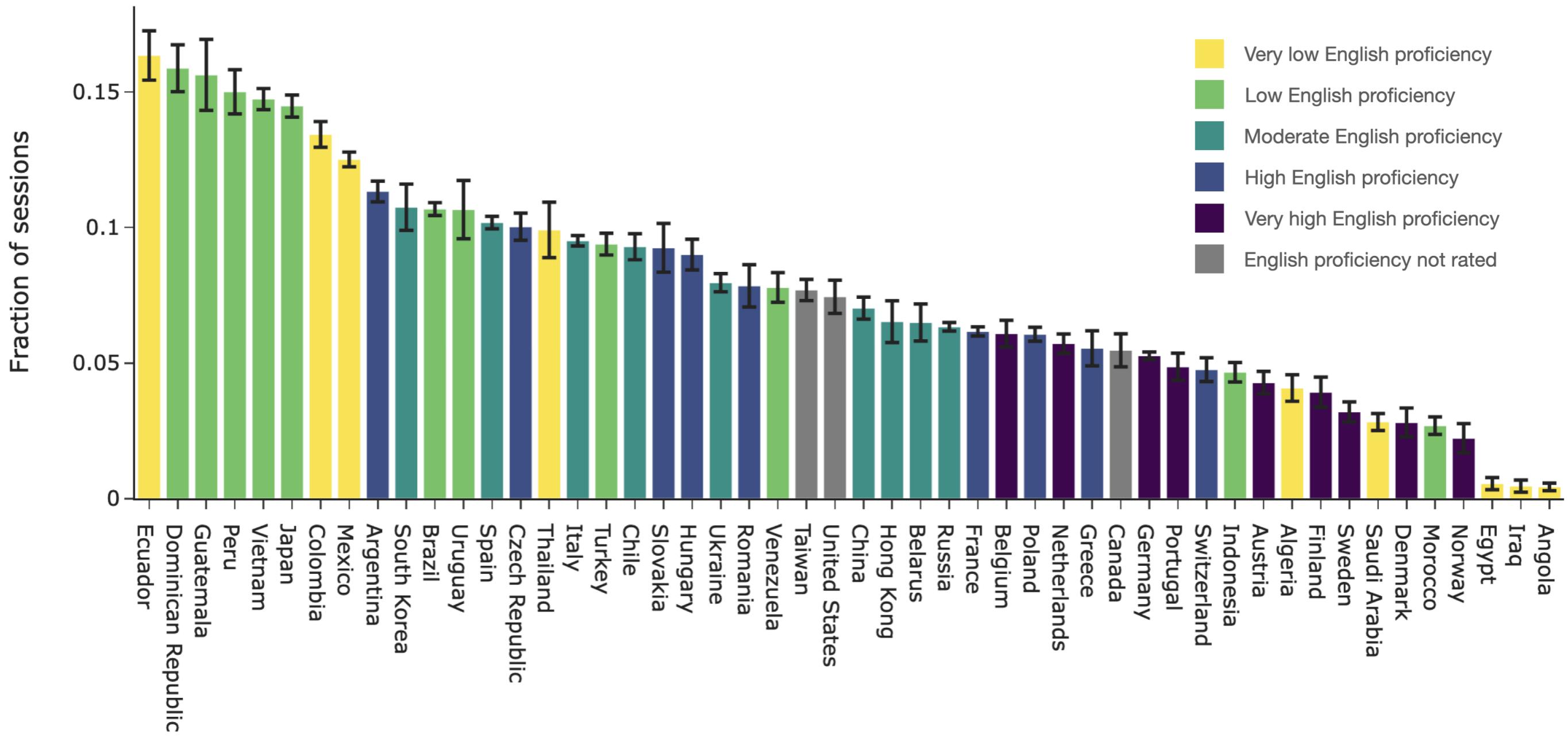
# In-browser machine translation use

If shown English, 5-10% of users use their browser's built-in MT



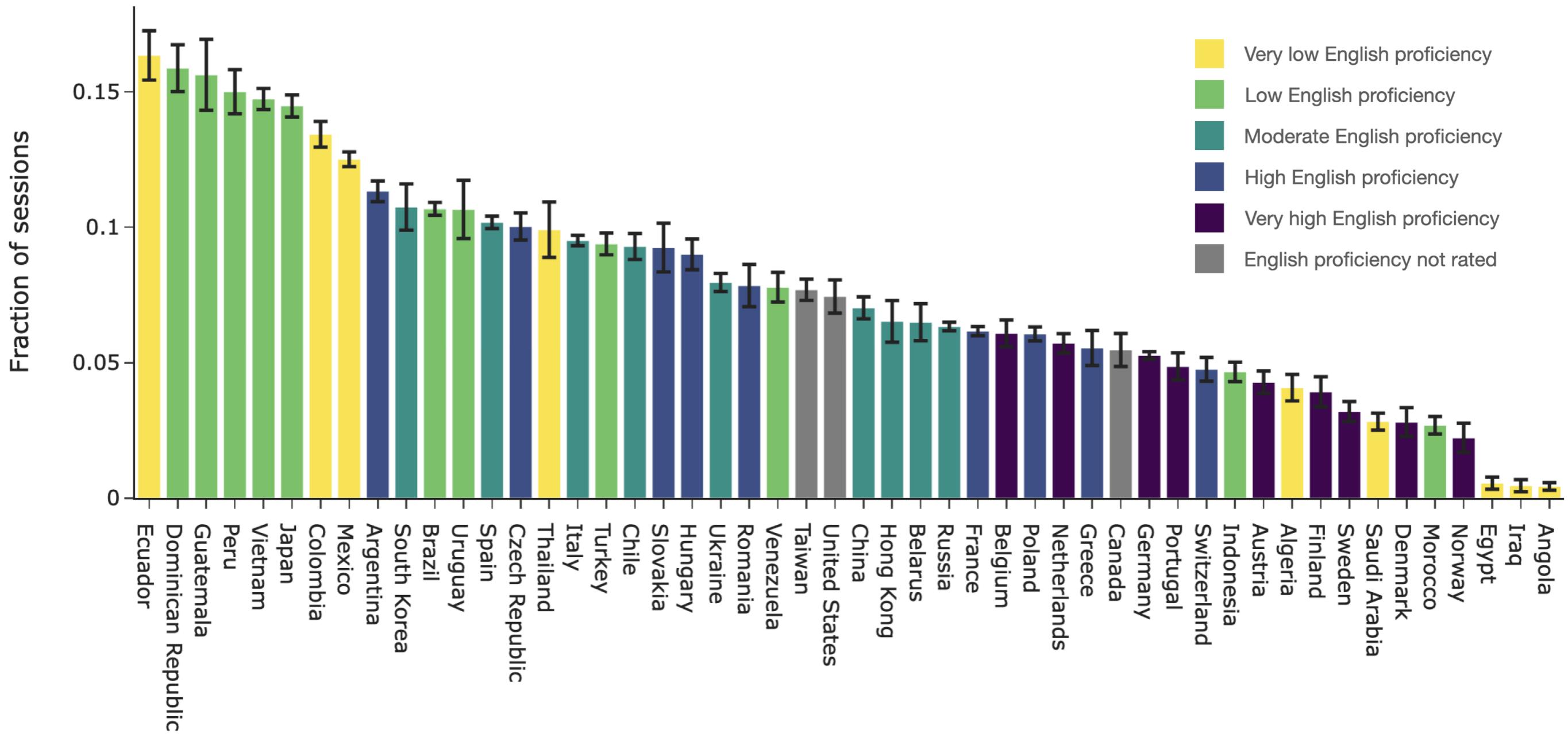
# In-browser MT use is higher in countries with moderate or lower English proficiency

Usage of in-browser MT by country, in sessions where user was shown English initially (Site 1)



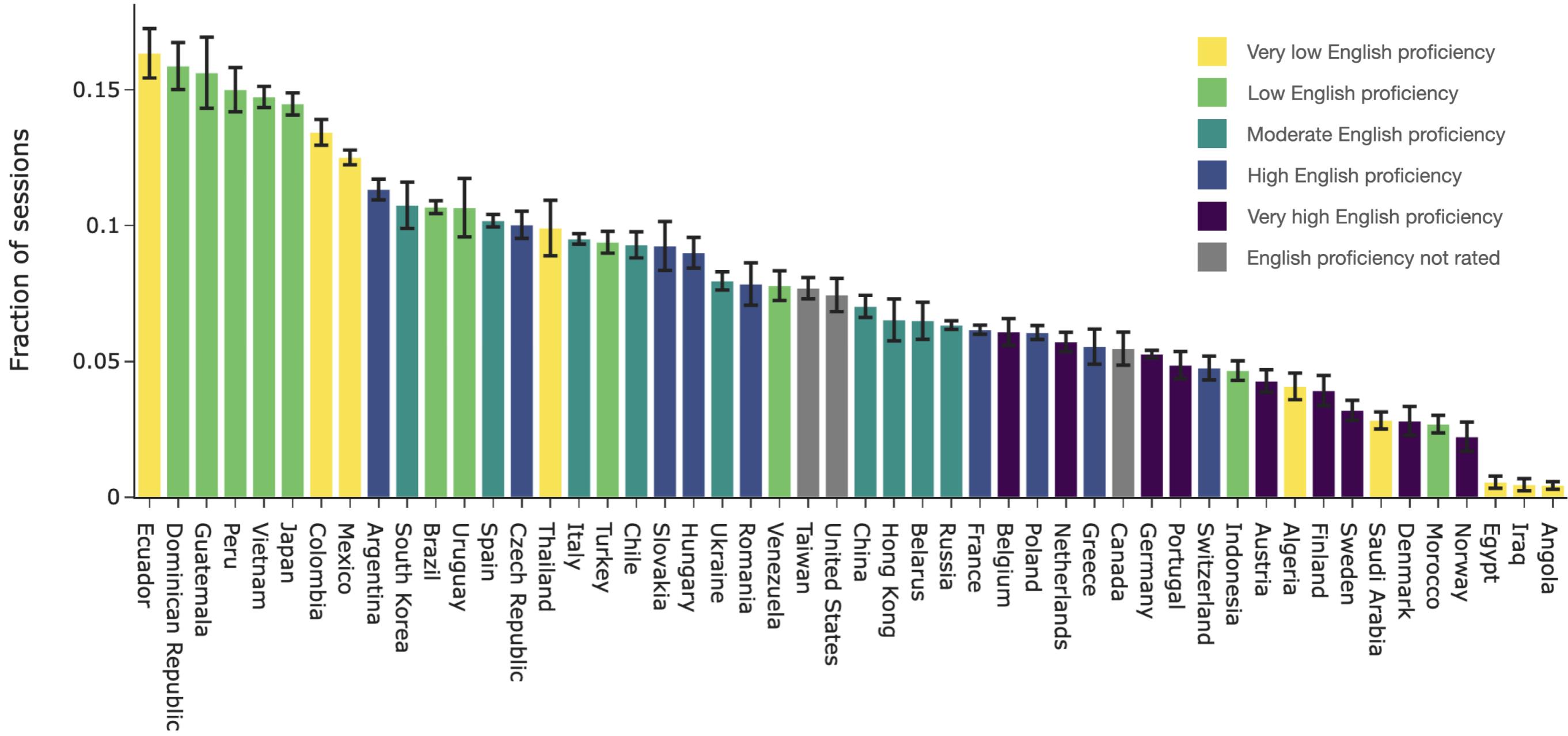
# In-browser MT used in 9.8% of sessions from moderate or lower English proficiency countries (among sessions with non-English preferred language)

Usage of in-browser MT by country, in sessions where user was shown English initially (Site 1)



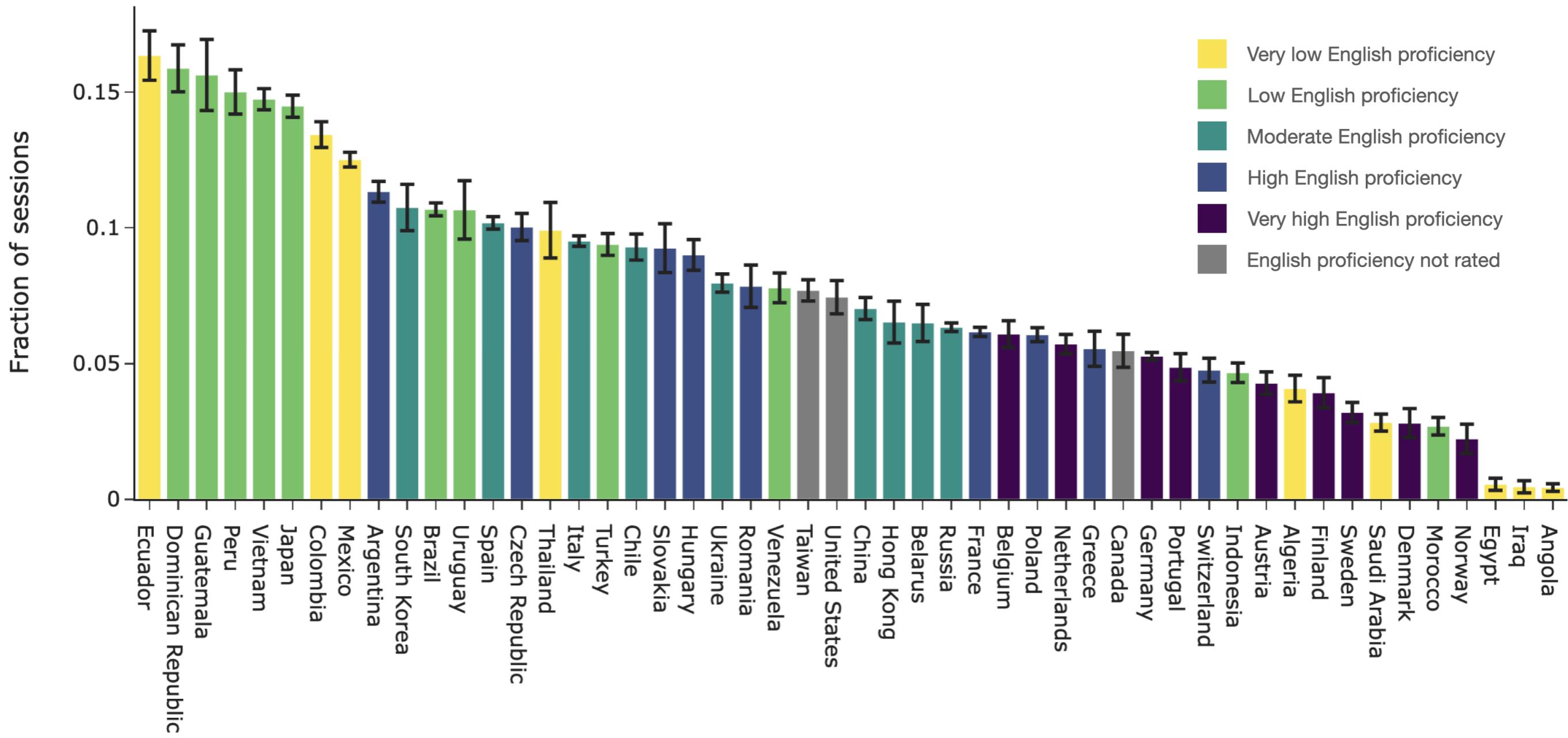
# In-browser MT used in 6.1% of sessions from high or very high proficiency countries (among sessions with non-English preferred language)

Usage of in-browser MT by country, in sessions where user was shown English initially (Site 1)



# In-browser MT use is significantly higher in countries with moderate or lower English proficiency ( $\chi^2 = 3797$ , $p < 0.0001$ )

Usage of in-browser MT by country, in sessions where user was shown English initially (Site 1)



Does localizing a website with professional translators improve engagement, vs showing MT or English?

- Showing human translations or MT both increase engagement, compared to showing English
- Human translations increase some engagement metrics (clicking non-download links and scrolling) but not others, compared to showing MT

Should we show translations (human or MT) by default, or show English by default with a language switcher?

- Users switch 10x more if initially shown English than if shown a translation - even if that translation is machine translation
- If showing English by default, engagement is significantly lower than if showing a translation (human or MT) by default

If we show users English, do users end up using their browser's built-in machine translation?

- 5-10% of users shown English used their browser's built-in MT
- Use of in-browser MT is higher in countries with lower English proficiency