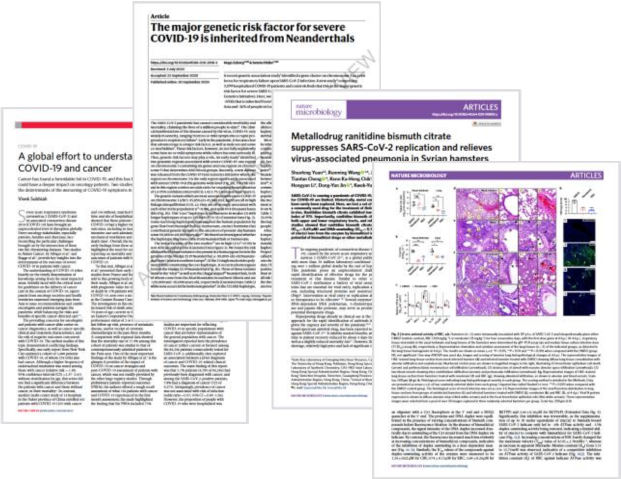
# What Science-Related Topics Need to Be Popularized? A Comparative Study

22-23 September 2021

Irina Ovchinnikova, Diana Nurbakova, Liana Ermakova

# Motivation



A global effort to understa
COVID-19 and cancer

Article

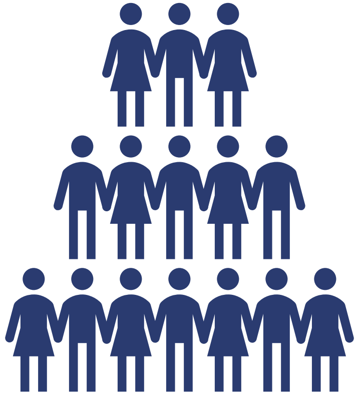
The major genetic risk factor for severe COVID-19 is inherited from Neanderthals

nature microbiology ARTICLES

Metallodrug ranitidine bismuth citrate suppresses SARS-CoV-2 replication and relieves virus-associated pneumonia in Syrian hamsters

NATURE MICROBIOLOGY ARTICLES

*Scientific popularistion*

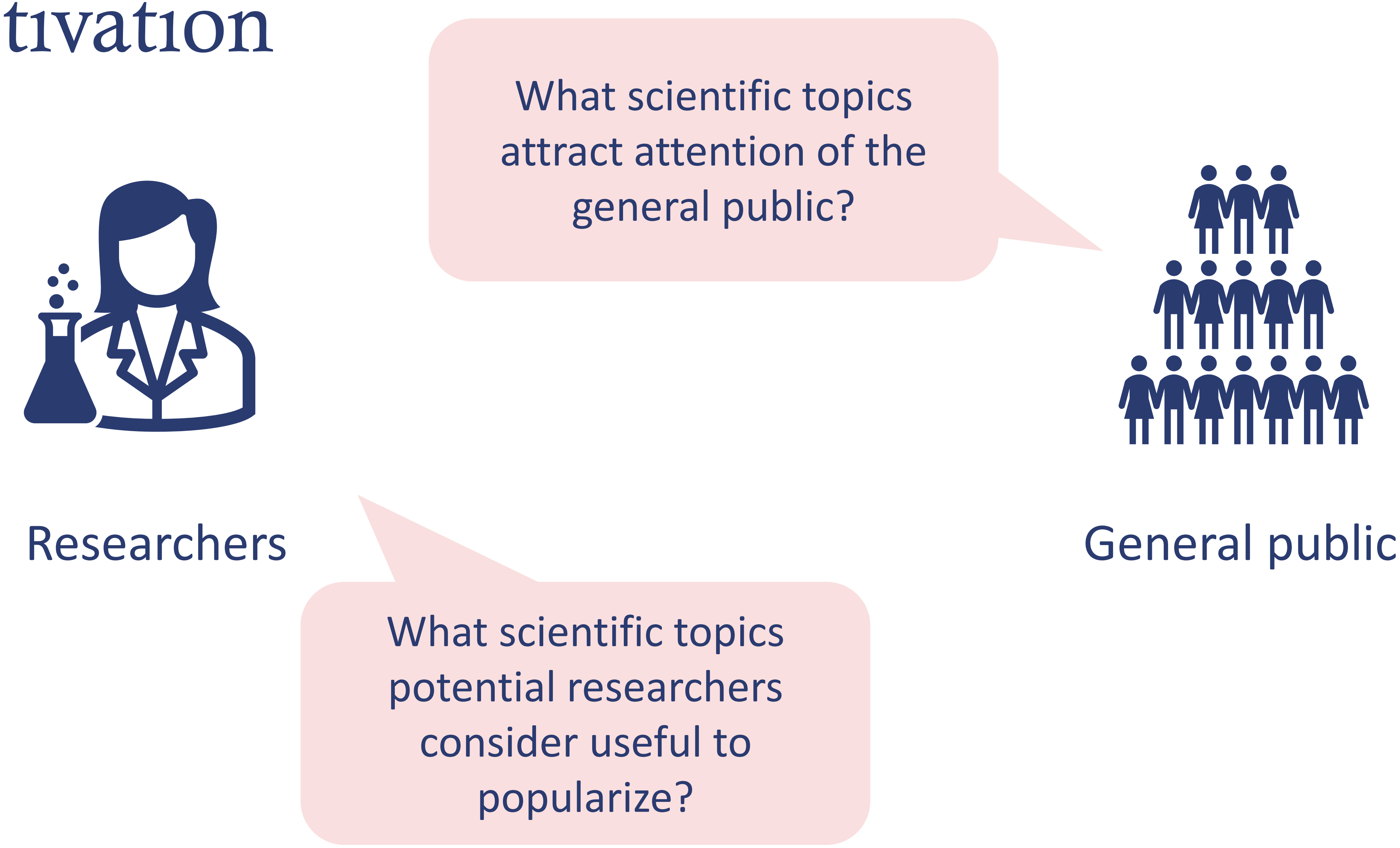


Scientific literature

General public

- Objective
- Full of terminology
- Complicated
- Background knowledge required for understanding

# Motivation



What scientific topics attract attention of the general public?

Researchers

General public

What scientific topics potential researchers consider useful to popularize?

# Plan

PART 1

## Topics from Q&A systems and scientific search engines

- ☑ Query datasets
- ☑ Topics by categories
- ☑ Topics by term frequency

PART 2

## Survey

- ☑ Survey description
- ☑ Results

# Queries from Q&A systems and scientific search engines

# Q&A Services

Forums, Q&A systems, search engines…

Q&A

ELI5

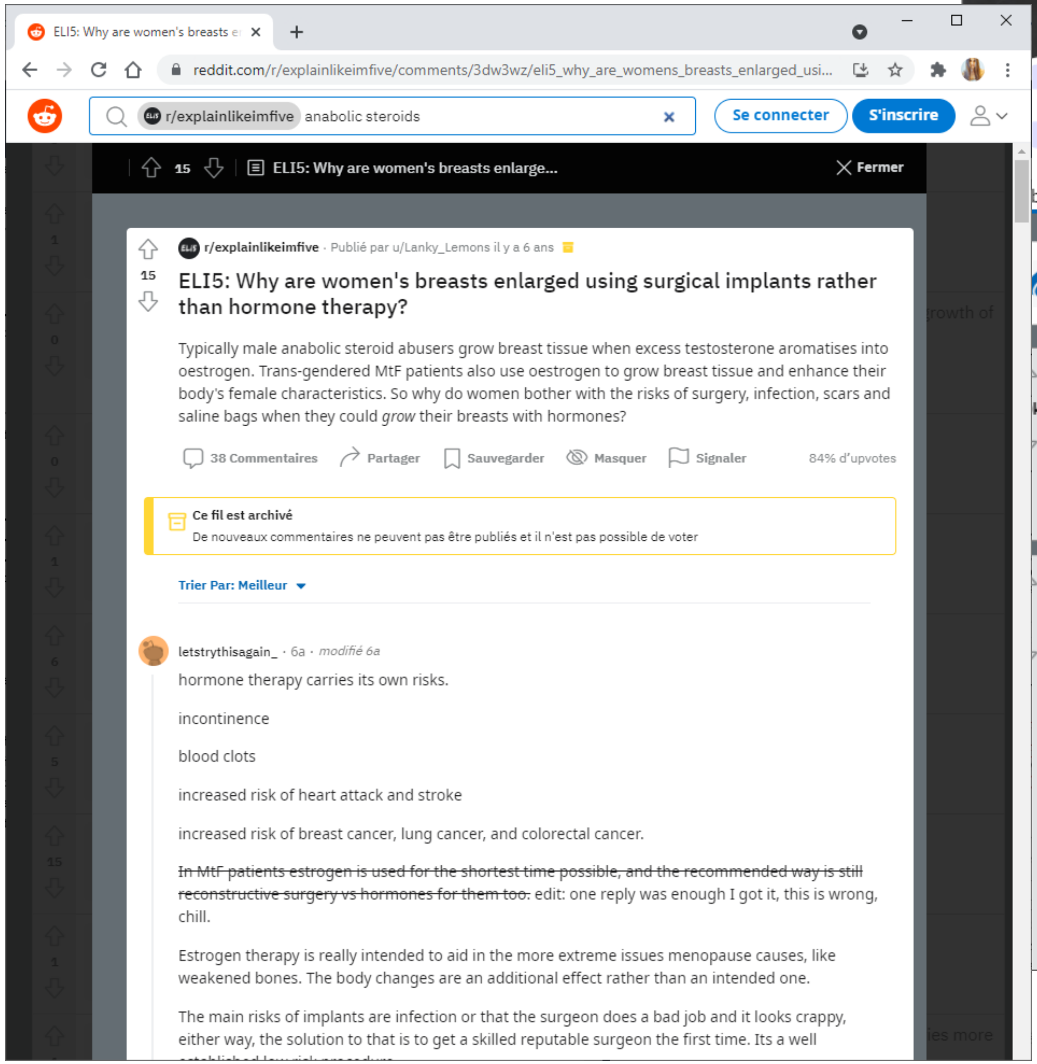
*Yahoo!* answers

Scientific journalism & scientific articles search engine

ScienceX

ISTEX

# Q&A Services


ELI5: Why are women's breasts e
reddit.com/r/explainlikeimfive/comments/3dw3wz/eli5_why_are_womens_breasts_enlarged_usi...
r/explainlikeimfive
anabolic steroids
Se connecter
S'inscrire
15
ELI5: Why are women's breasts enlarge...
Fermer

r/explainlikeimfive · Publié par u/Lanky_Lemons il y a 6 ans

15

ELI5: Why are women's breasts enlarged using surgical implants rather than hormone therapy?

Typically male anabolic steroid abusers grow breast tissue when excess testosterone aromatises into oestrogen. Trans-gendered MtF patients also use oestrogen to grow breast tissue and enhance their body's female characteristics. So why do women bother with the risks of surgery, infection, scars and saline bags when they could *grow* their breasts with hormones?

38 Commentaires
Partager
Sauvegarder
Masquer
Signaler
84% d'upvotes

**Ce fil est archivé**

De nouveaux commentaires ne peuvent pas être publiés et il n'est pas possible de voter

Trier Par: Meilleur

letstrythisagain_ · 6a · *modifié 6a*

hormone therapy carries its own risks.

incontinence

blood clots

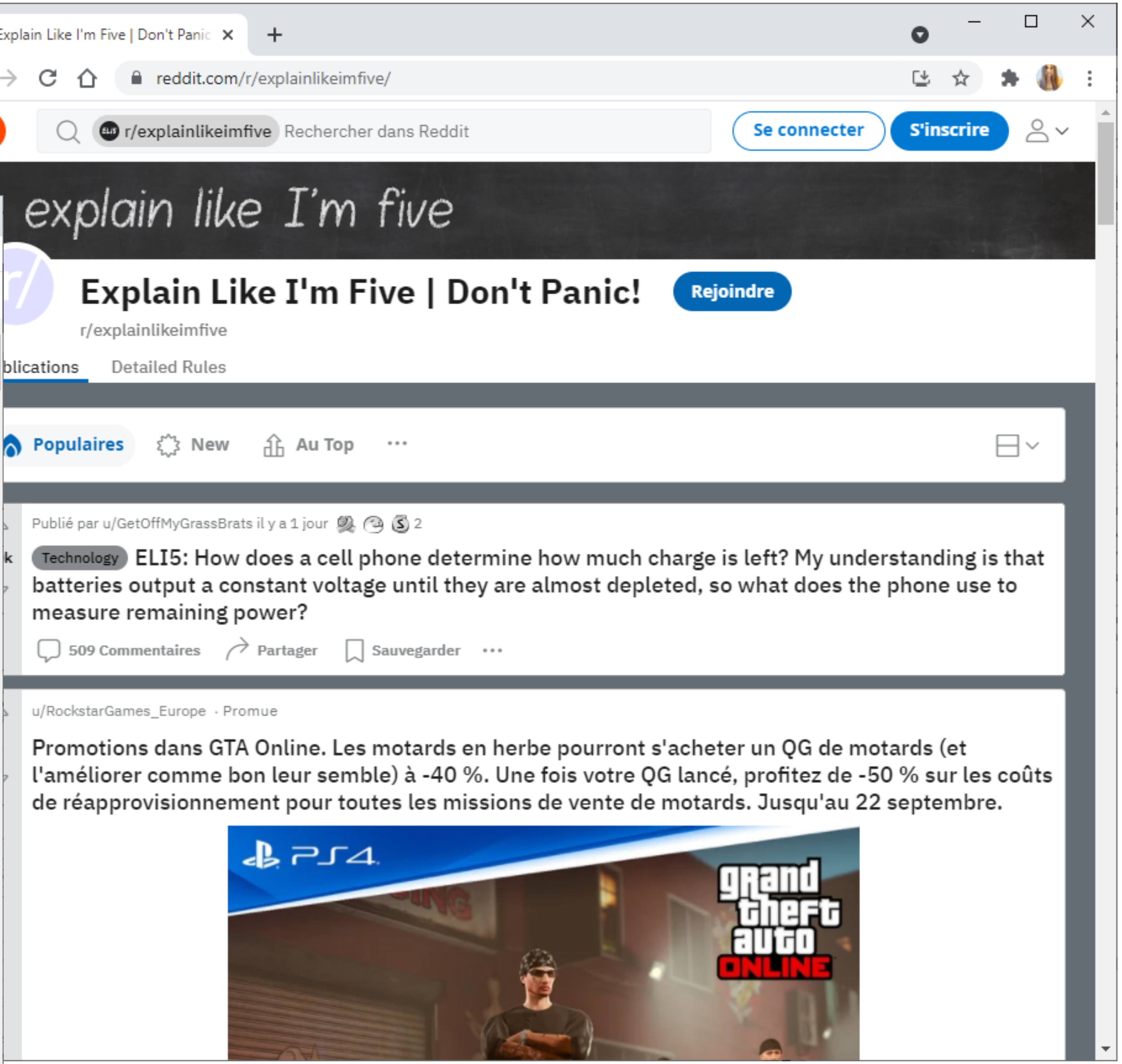
increased risk of heart attack and stroke

increased risk of breast cancer, lung cancer, and colorectal cancer.

~~In MtF patients estrogen is used for the shortest time possible, and the recommended way is still reconstructive surgery vs hormones for them too.~~ edit: one reply was enough I got it, this is wrong, chill.

Estrogen therapy is really intended to aid in the more extreme issues menopause causes, like weakened bones. The body changes are an additional effect rather than an intended one.

The main risks of implants are infection or that the surgeon does a bad job and it looks crappy, either way, the solution to that is to get a skilled reputable surgeon the first time. Its a well


Explain Like I'm Five | Don't Panic
reddit.com/r/explainlikeimfive/
r/explainlikeimfive
Rechercher dans Reddit
Se connecter
S'inscrire
explain like I'm five

## Explain Like I'm Five | Don't Panic!

Rejoindre
r/explainlikeimfive
blications
Detailed Rules
Populaires
New
Au Top

Publié par u/GetOffMyGrassBrats il y a 1 jour 2

Technology ELI5: How does a cell phone determine how much charge is left? My understanding is that batteries output a constant voltage until they are almost depleted, so what does the phone use to measure remaining power?

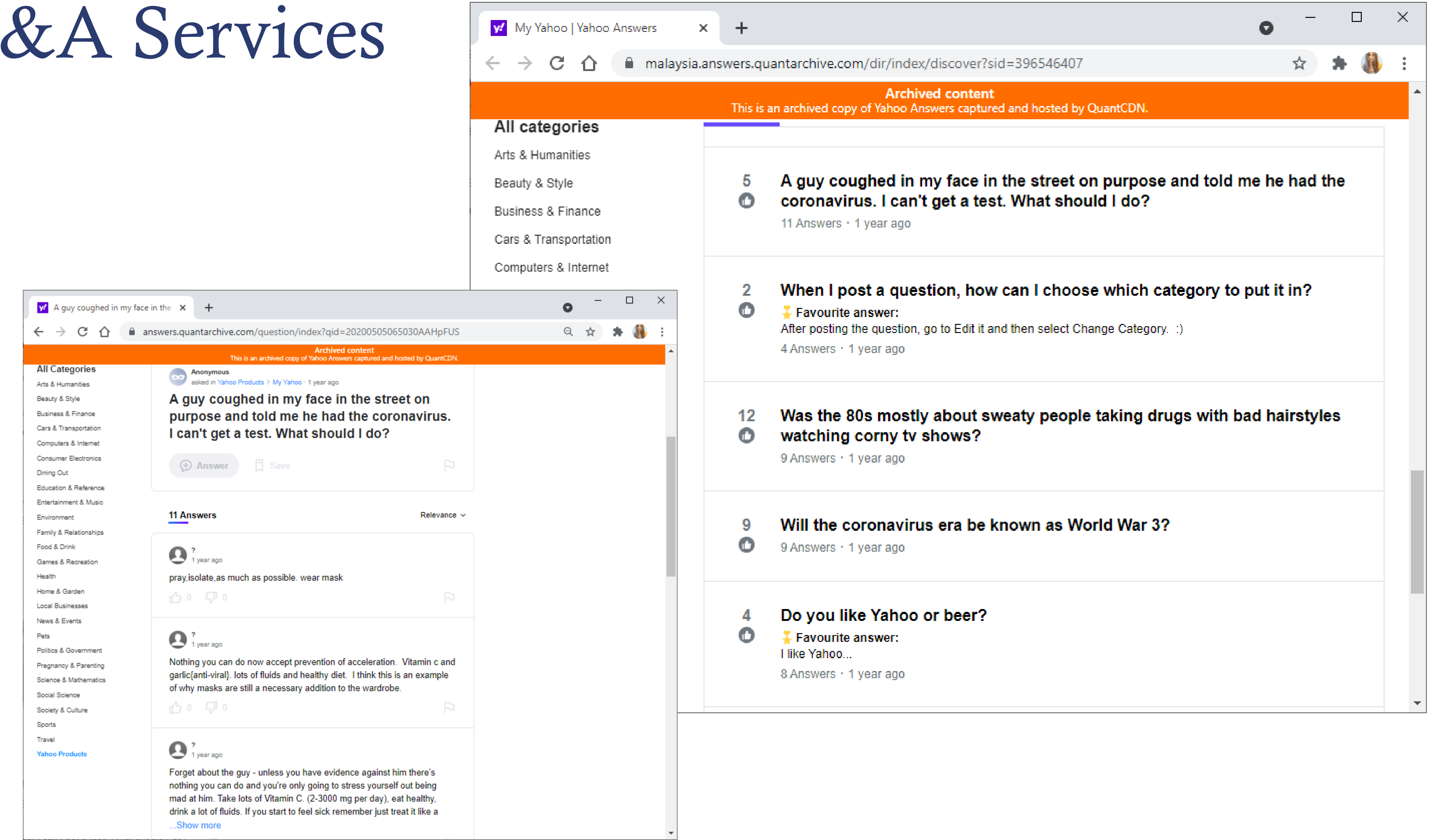
509 Commentaires
Partager
Sauvegarder

u/RockstarGames_Europe · Promue

Promotions dans GTA Online. Les motards en herbe pourront s'acheter un QG de motards (et l'améliorer comme bon leur semble) à -40 %. Une fois votre QG lancé, profitez de -50 % sur les coûts de réapprovisionnement pour toutes les missions de vente de motards. Jusqu'au 22 septembre.

PS4
grand theft auto ONLINE

# Q&A Services



malaysia.answers.quantarchive.com/dir/index/discover?sid=396546407

**Archived content**
This is an archived copy of Yahoo Answers captured and hosted by QuantCDN.

**All categories**
Arts & Humanities
Beauty & Style
Business & Finance
Cars & Transportation
Computers & Internet

5 **A guy coughed in my face in the street on purpose and told me he had the coronavirus. I can't get a test. What should I do?**
11 Answers · 1 year ago

2 **When I post a question, how can I choose which category to put it in?**
Favourite answer:
After posting the question, go to Edit it and then select Change Category. :)
4 Answers · 1 year ago

12 **Was the 80s mostly about sweaty people taking drugs with bad hairstyles watching corny tv shows?**
9 Answers · 1 year ago

9 **Will the coronavirus era be known as World War 3?**
9 Answers · 1 year ago

4 **Do you like Yahoo or beer?**
Favourite answer:
I like Yahoo...
8 Answers · 1 year ago

answers.quantarchive.com/question/index?qid=20200505065030AAHpFUS

**Archived content**
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**All Categories**
Arts & Humanities
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Computers & Internet
Consumer Electronics
Dining Out
Education & Reference
Entertainment & Music
Environment
Family & Relationships
Food & Drink
Games & Recreation
Health
Home & Garden
Local Businesses
News & Events
Pets
Politics & Government
Pregnancy & Parenting
Science & Mathematics
Social Science
Society & Culture
Sports
Travel
Yahoo Products

Anonymous
asked in Yahoo Products > My Yahoo · 1 year ago

**A guy coughed in my face in the street on purpose and told me he had the coronavirus. I can't get a test. What should I do?**

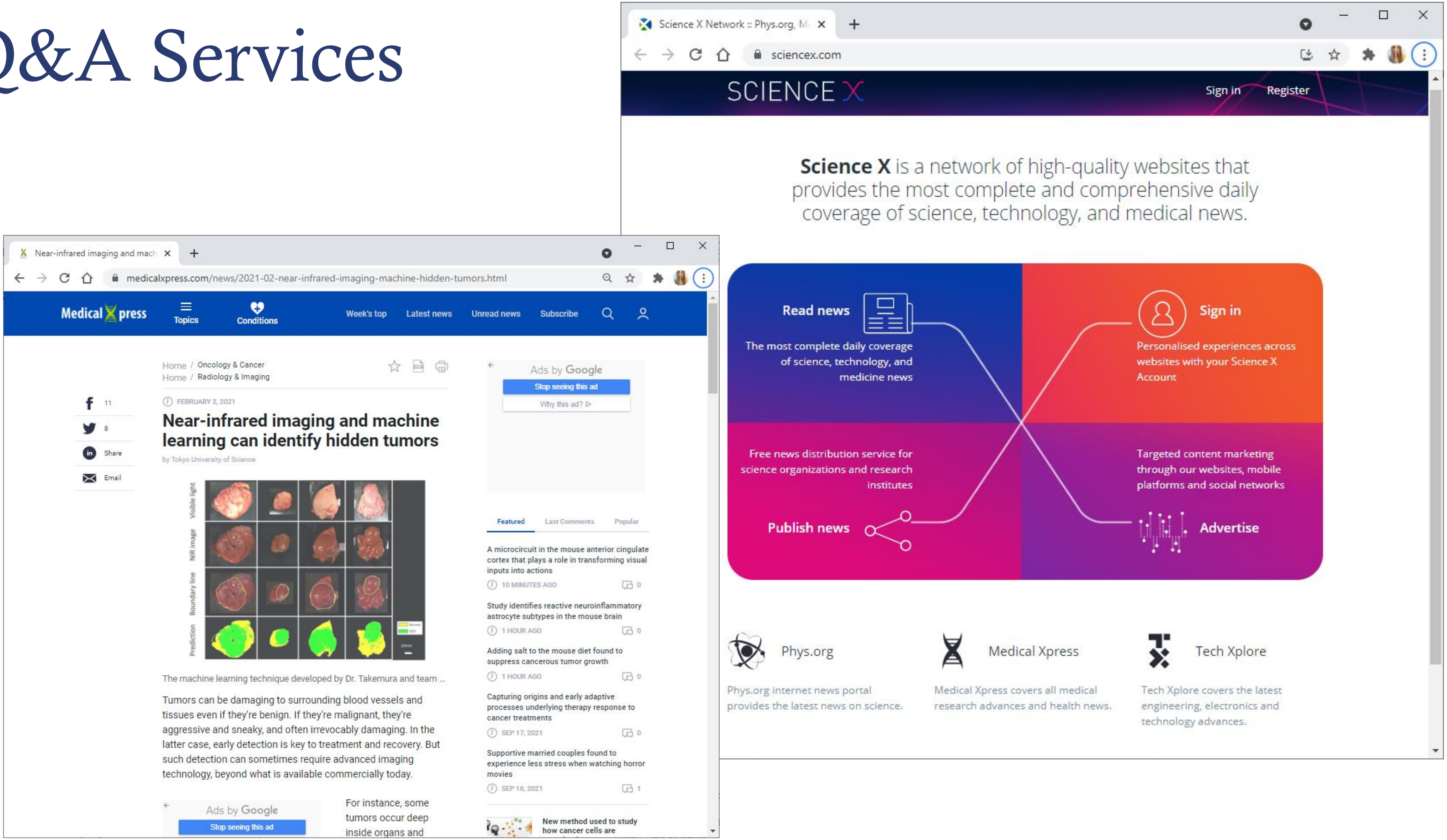
**11 Answers**

?
1 year ago
pray,isolate,as much as possible. wear mask
0 0

?
1 year ago
Nothing you can do now accept prevention of acceleration.  Vitamin c and garlic{anti-viral}. lots of fluids and healthy diet.  I think this is an example of why masks are still a necessary addition to the wardrobe.
0 0

?
1 year ago
Forget about the guy - unless you have evidence against him there's nothing you can do and you're only going to stress yourself out being mad at him. Take lots of Vitamin C. (2-3000 mg per day), eat healthy, drink a lot of fluids. If you start to feel sick remember just treat it like a ...Show more

# Q&A Services



Science X Network :: Phys.org, M
sciencex.com
SCIENCE X
Sign in
Register
Read news
Sign in
Publish news
Advertise
Phys.org
Medical Xpress
Tech Xplore
Near-infrared imaging and mach
medicalxpress.com/news/2021-02-near-infrared-imaging-machine-hidden-tumors.html
Medical Xpress
Topics
Conditions
Week's top
Latest news
Unread news
Subscribe
Home / Oncology & Cancer
Home / Radiology & Imaging
11
8
Share
Email
Visible light
NIR image
Boundary line
Prediction
Ads by Google
Stop seeing this ad
Why this ad?
Featured
Last Comments
Popular

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Phys.org internet news portal provides the latest news on science.

Medical Xpress covers all medical research advances and health news.

Tech Xplore covers the latest engineering, electronics and technology advances.

FEBRUARY 2, 2021

**Near-infrared imaging and machine learning can identify hidden tumors**

by Tokyo University of Science

The machine learning technique developed by Dr. Takemura and team ...

Tumors can be damaging to surrounding blood vessels and tissues even if they're benign. If they're malignant, they're aggressive and sneaky, and often irrevocably damaging. In the latter case, early detection is key to treatment and recovery. But such detection can sometimes require advanced imaging technology, beyond what is available commercially today.

For instance, some tumors occur deep inside organs and

A microcircuit in the mouse anterior cingulate cortex that plays a role in transforming visual inputs into actions
10 MINUTES AGO 0

Study identifies reactive neuroinflammatory astrocyte subtypes in the mouse brain
1 HOUR AGO 0

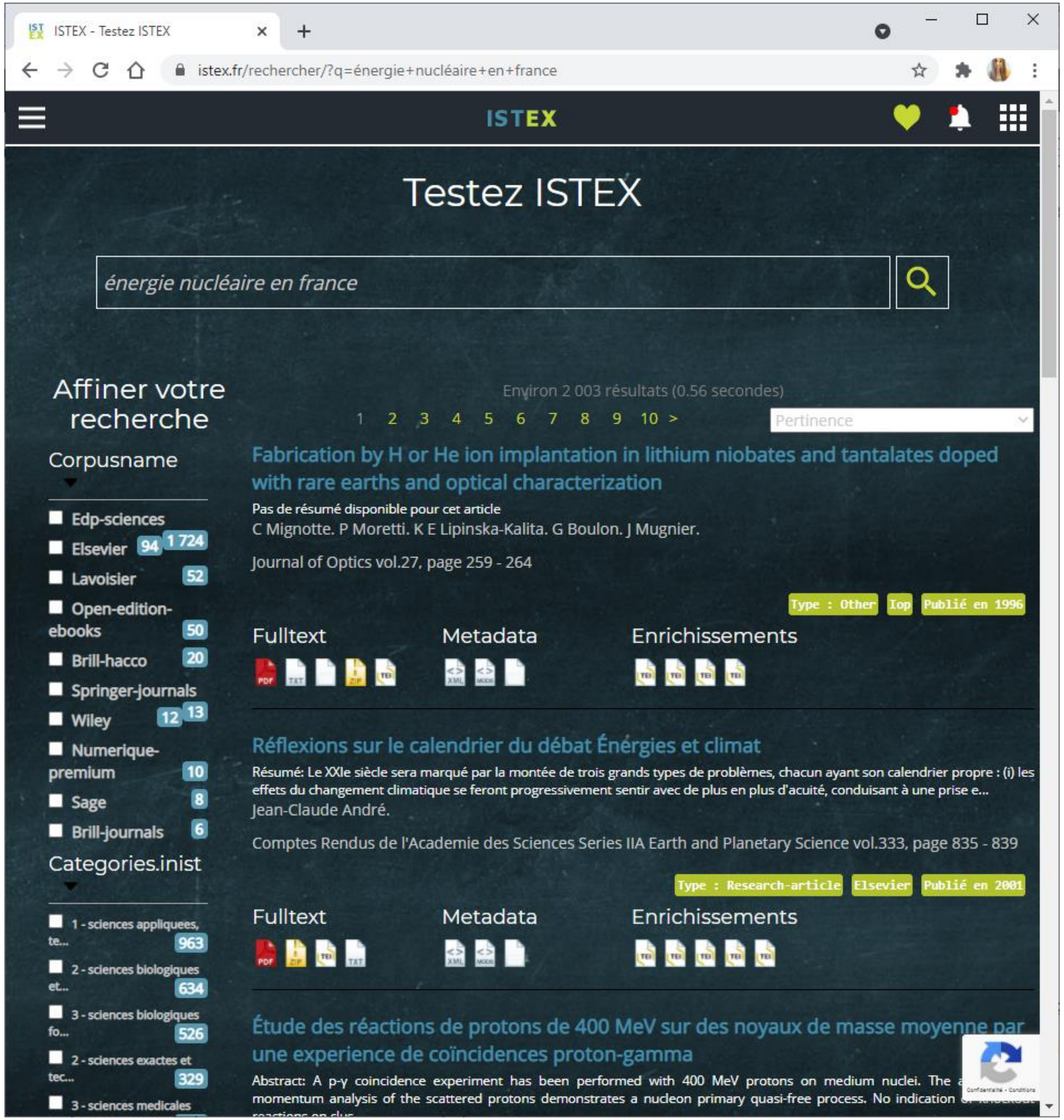
Adding salt to the mouse diet found to suppress cancerous tumor growth
1 HOUR AGO 0

Capturing origins and early adaptive processes underlying therapy response to cancer treatments
SEP 17, 2021 0

Supportive married couples found to experience less stress when watching horror movies
SEP 16, 2021 1

New method used to study how cancer cells are

# Q&A Services



## Testez ISTEX

*énergie nucléaire en france*

**Affiner votre recherche**

**Corpusname**

- ☐ Edp-sciences 1 724
- ☐ Elsevier 94
- ☐ Lavoisier 52
- ☐ Open-edition-ebooks 50
- ☐ Brill-hacco 20
- ☐ Springer-journals 13
- ☐ Wiley 12
- ☐ Numerique-premium 10
- ☐ Sage 8
- ☐ Brill-journals 6

**Categories.inist**

- ☐ 1 - sciences appliquees, te... 963
- ☐ 2 - sciences biologiques et... 634
- ☐ 3 - sciences biologiques fo... 526
- ☐ 2 - sciences exactes et tec... 329
- ☐ 3 - sciences medicales

Environ 2 003 résultats (0.56 secondes)

1 2 3 4 5 6 7 8 9 10 >

Pertinence

**Fabrication by H or He ion implantation in lithium niobates and tantalates doped with rare earths and optical characterization**

Pas de résumé disponible pour cet article

C Mignotte. P Moretti. K E Lipinska-Kalita. G Boulon. J Mugnier.

Journal of Optics vol.27, page 259 - 264

Type : Other | Iop | Publié en 1996

Fulltext | Metadata | Enrichissements

**Réflexions sur le calendrier du débat Énergies et climat**

Résumé: Le XXIe siècle sera marqué par la montée de trois grands types de problèmes, chacun ayant son calendrier propre : (i) les effets du changement climatique se feront progressivement sentir avec de plus en plus d'acuité, conduisant à une prise e...

Jean-Claude André.

Comptes Rendus de l'Academie des Sciences Series IIA Earth and Planetary Science vol.333, page 835 - 839

Type : Research-article | Elsevier | Publié en 2001

Fulltext | Metadata | Enrichissements

**Étude des réactions de protons de 400 MeV sur des noyaux de masse moyenne par une experience de coïncidences proton-gamma**

Abstract: A p-γ coincidence experiment has been performed with 400 MeV protons on medium nuclei. The a momentum analysis of the scattered protons demonstrates a nucleon primary quasi-free process. No indication

# Q&A Services

| Dataset | Period of time | # queries | # avg. query length | Inner categories | # categories |
|---|---|---|---|---|---|
| ELI5 | 2015-2021 | 228 | 14.25 | ✓ | 11 |
| ScienceX | 08.04.2014-22.02.2021 | 11,253 | 9.78 | ✓ | 60 |
| Yahoo! | 2018-2021 | 13,014 | 11.91 | ✓ | 26 |
| ISTEX | 01.01.2019-31.12.2020 | 1,222,700 | 8.35 | ✗ | 0 |

# Analysis Directions

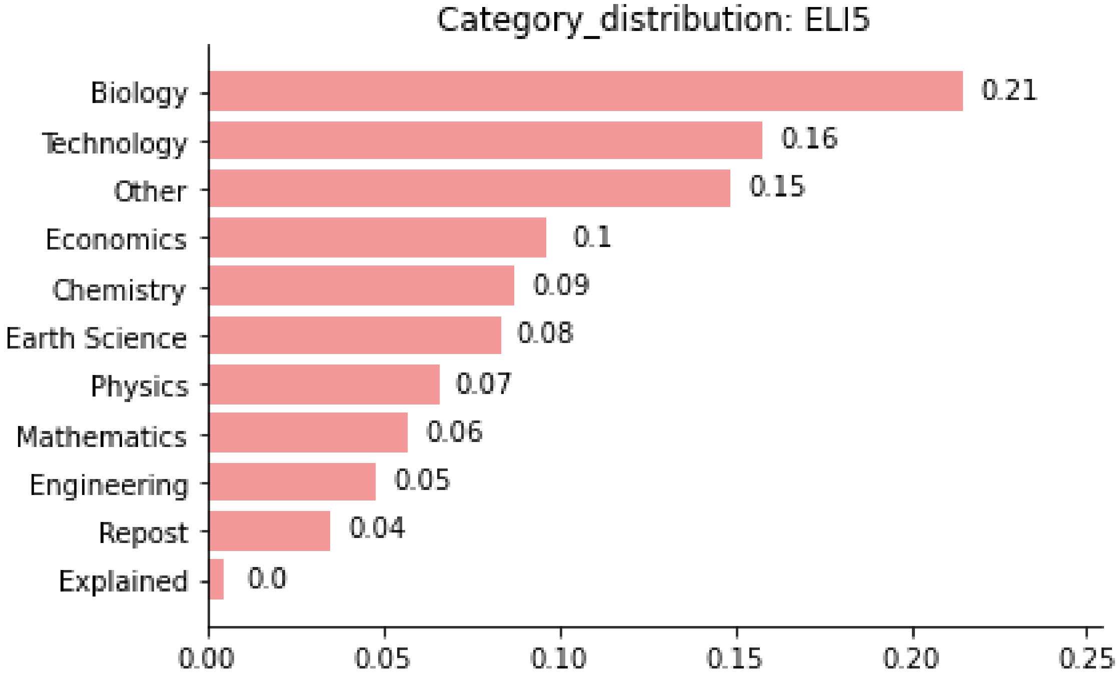
## Categories (topics)

identification of the categories (topics) of the queries and comparison of their distribution among datasets

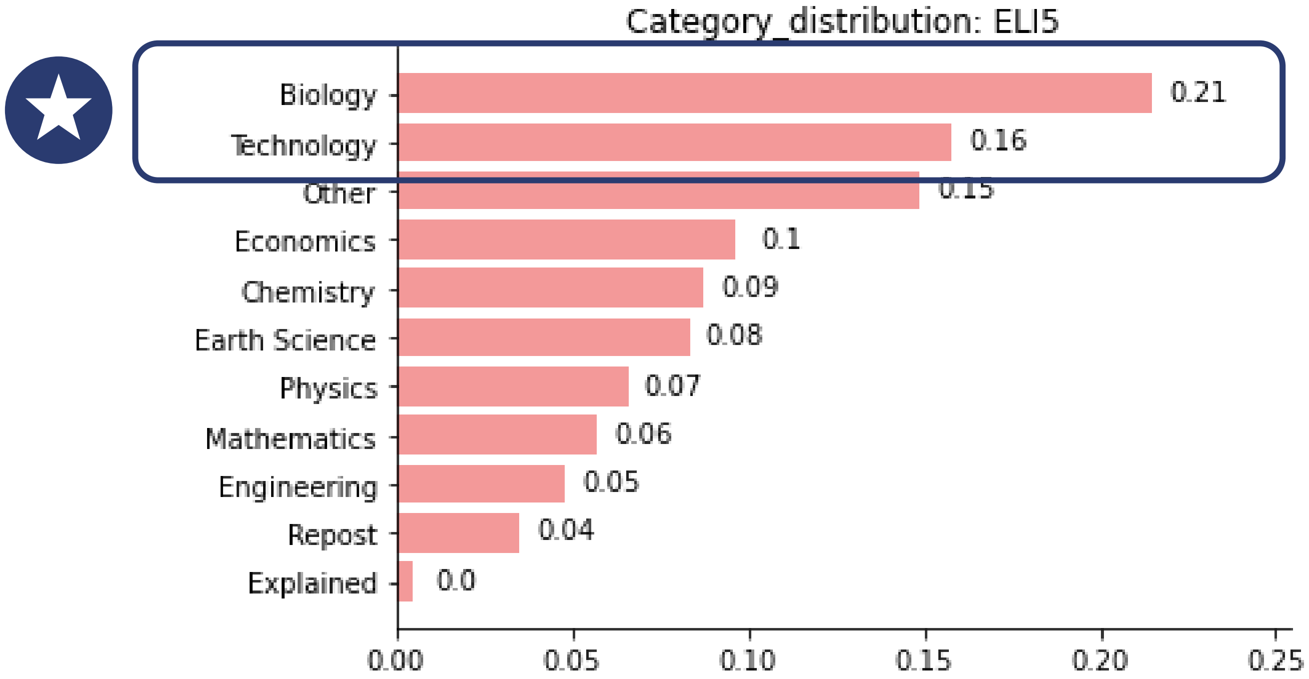
## Frequent Terms

identification of the most frequent terms per dataset and comparison of their distribution among datasets

# Results: Categories



# Results: Categories



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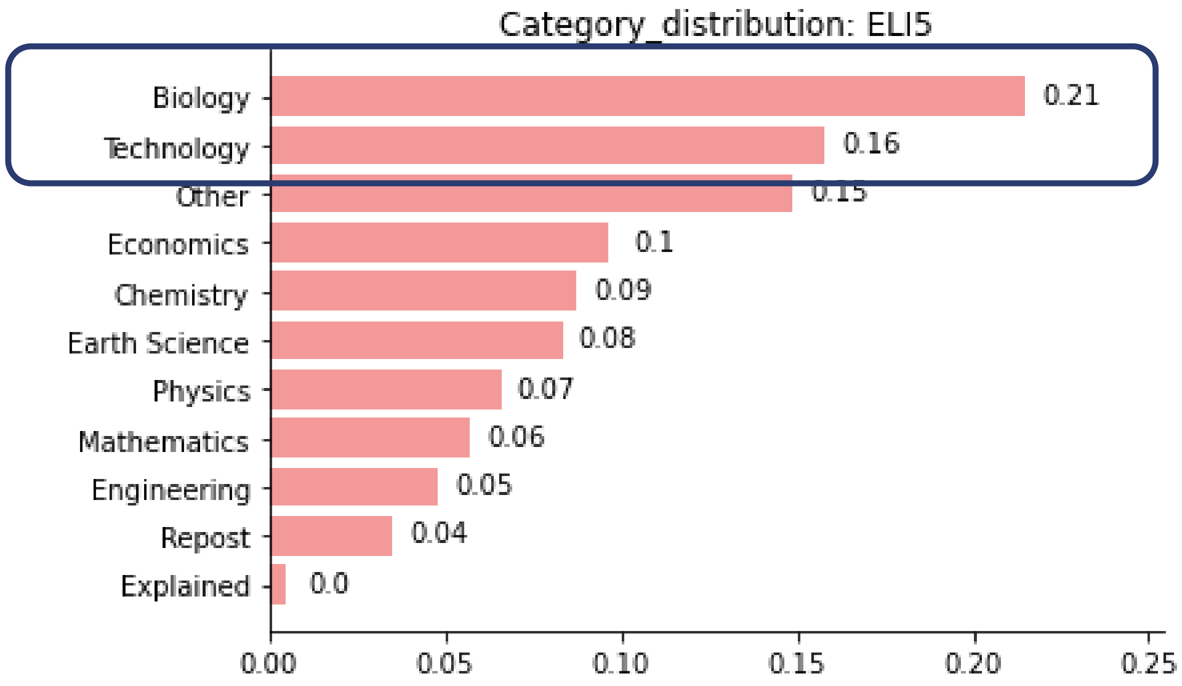
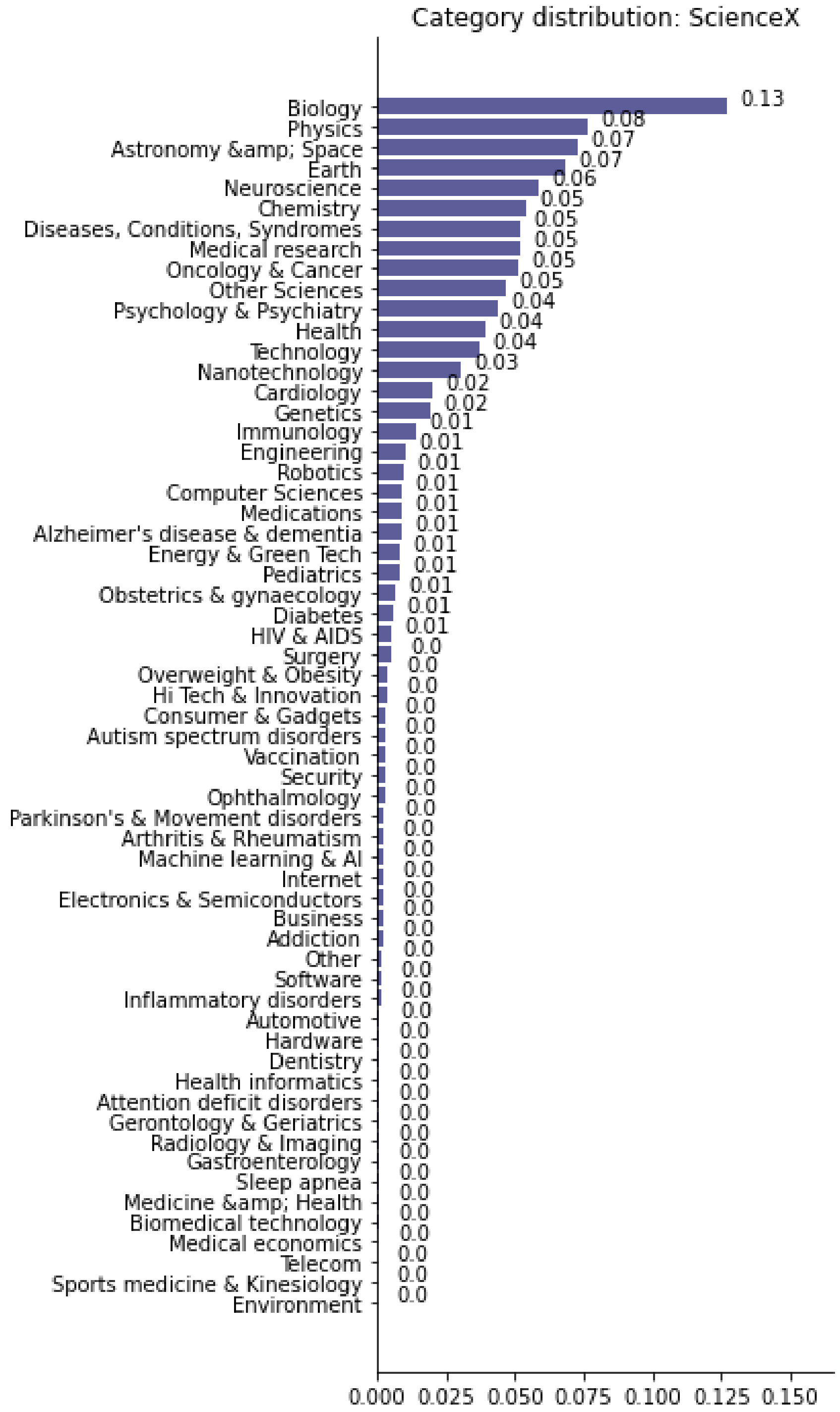
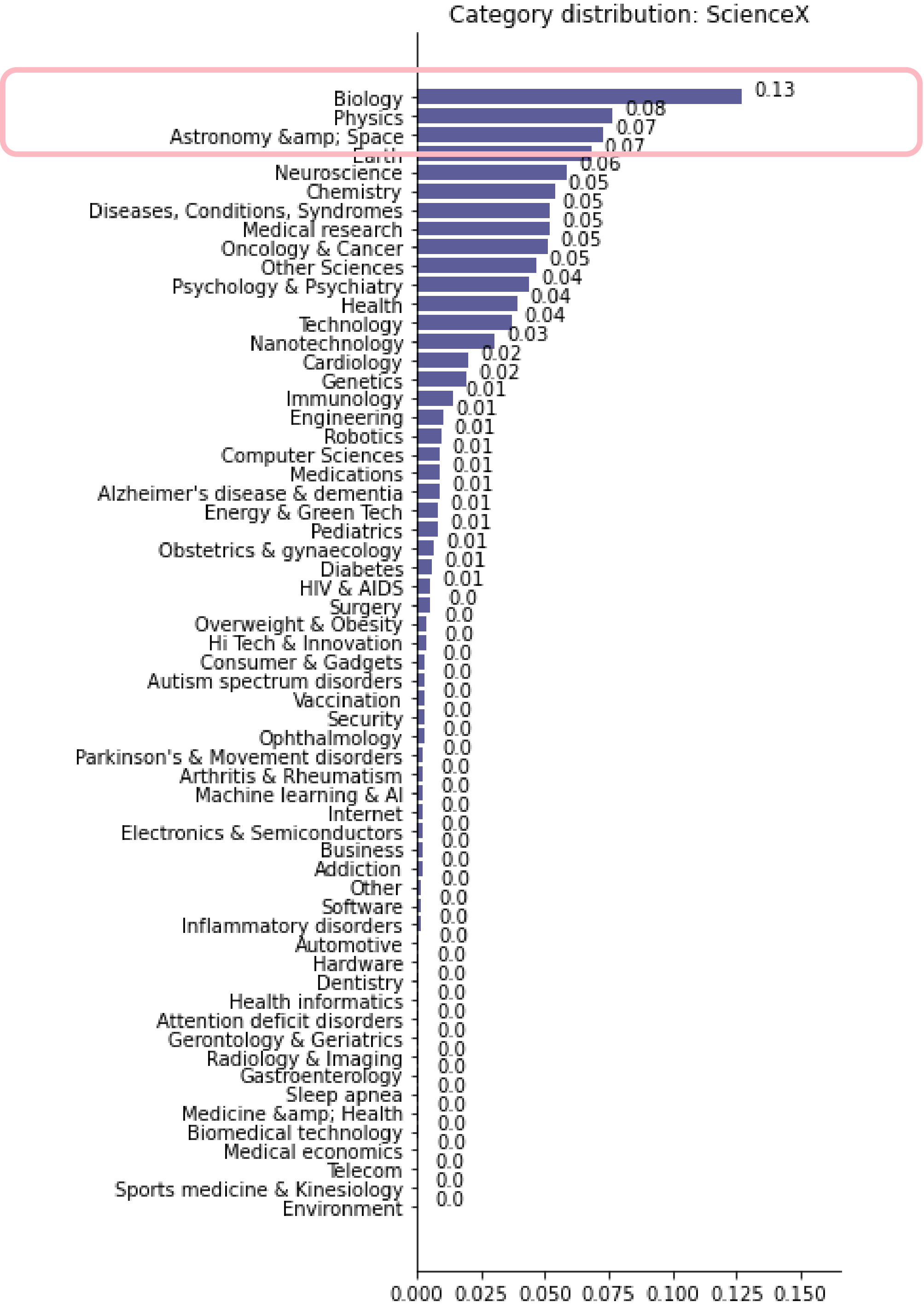


Natural curiosity

# Results: Categories

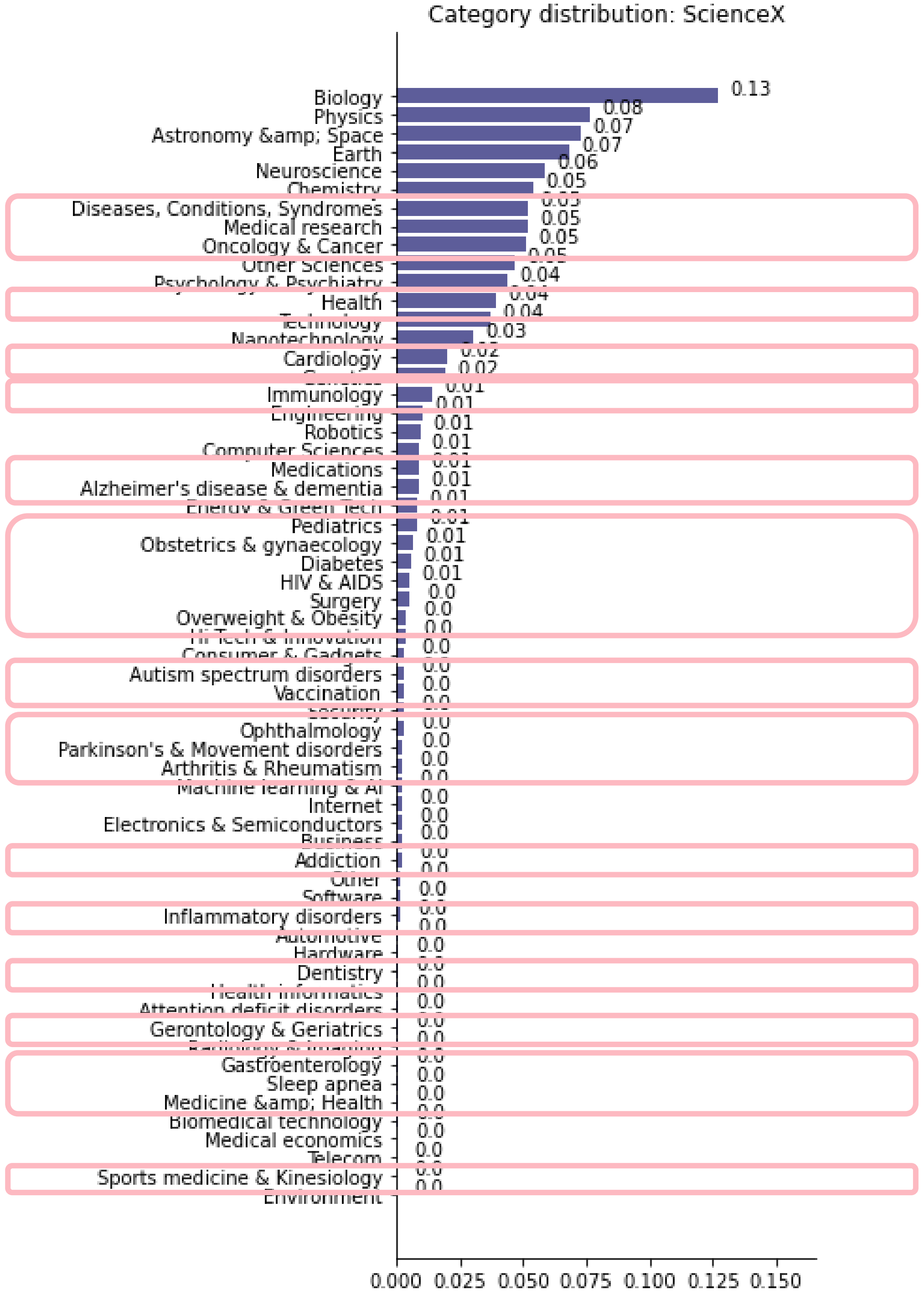


# Results: Categories



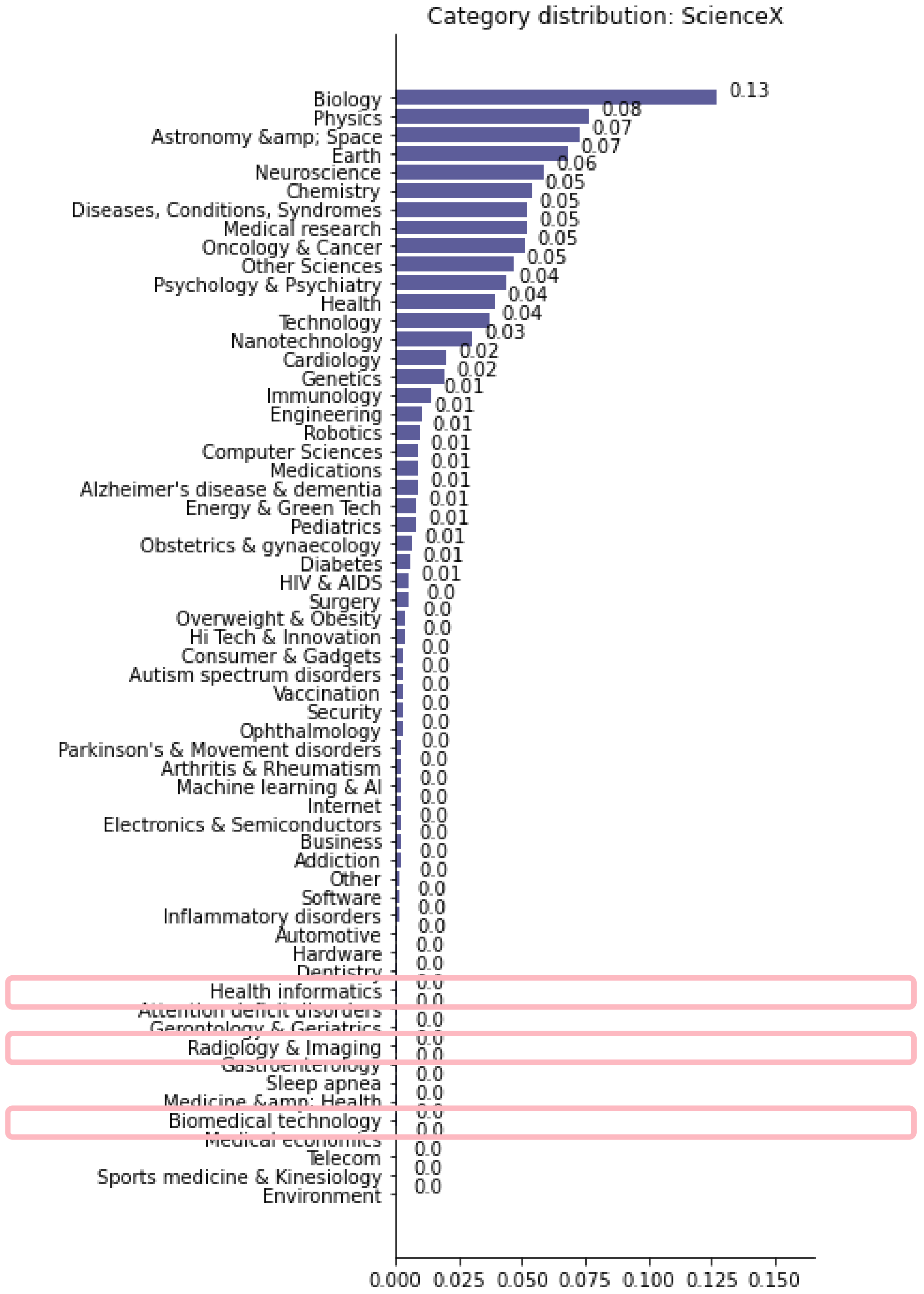
# Results: Categories

Health-related topics



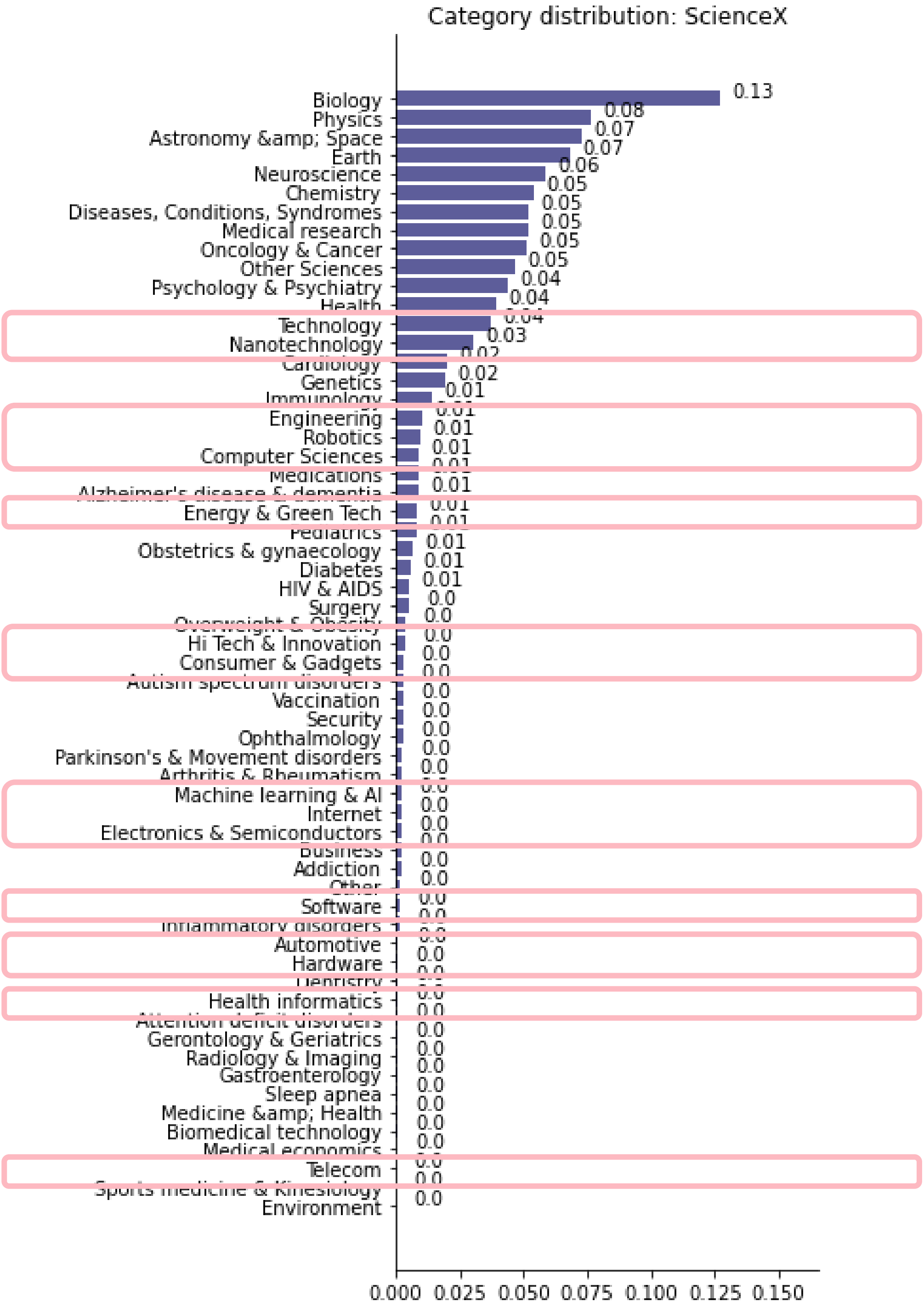
# Results: Categories

Bio-medical technologies

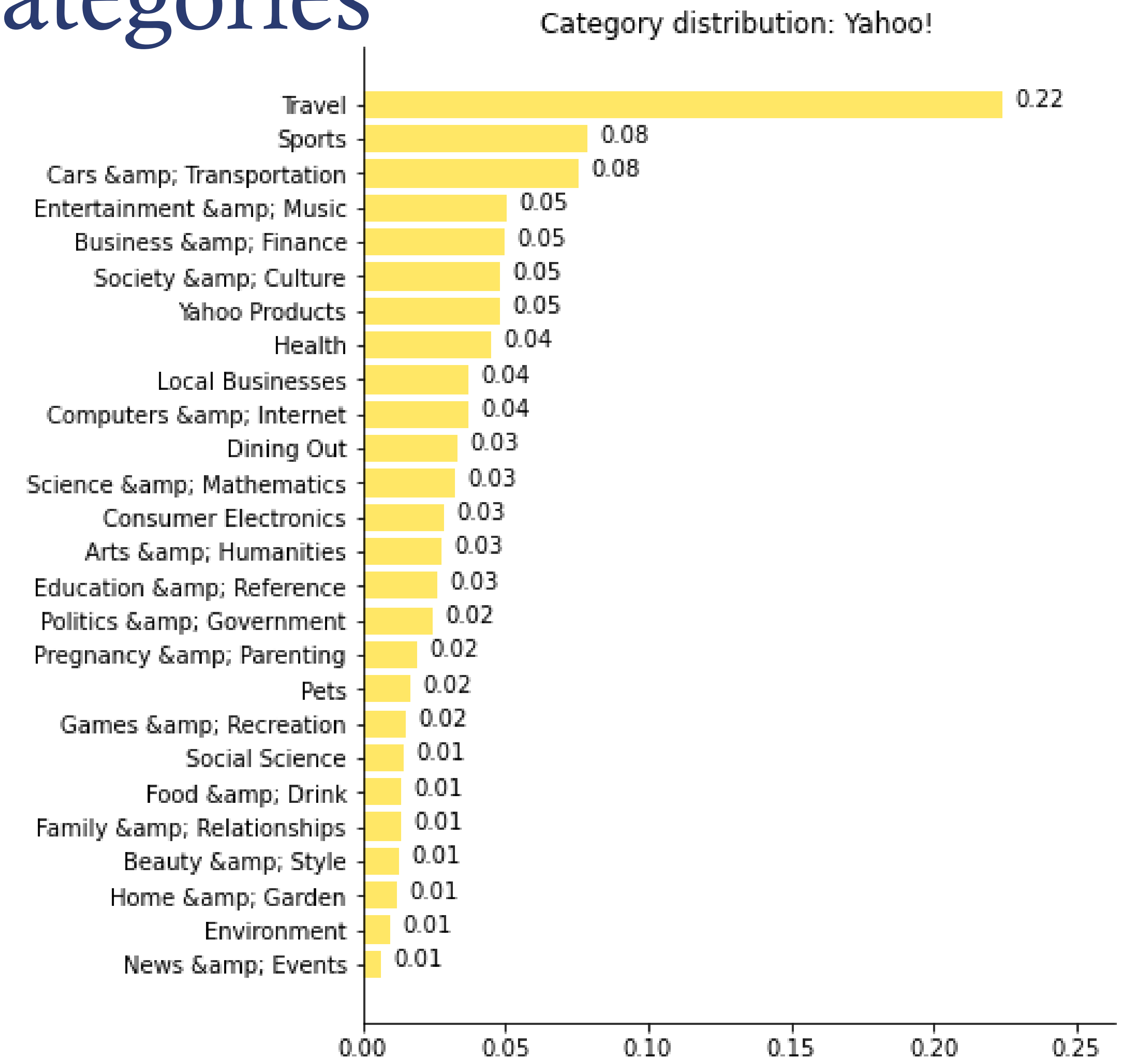


# Results: Categories

Technology & Computer Science



# Results: Categories



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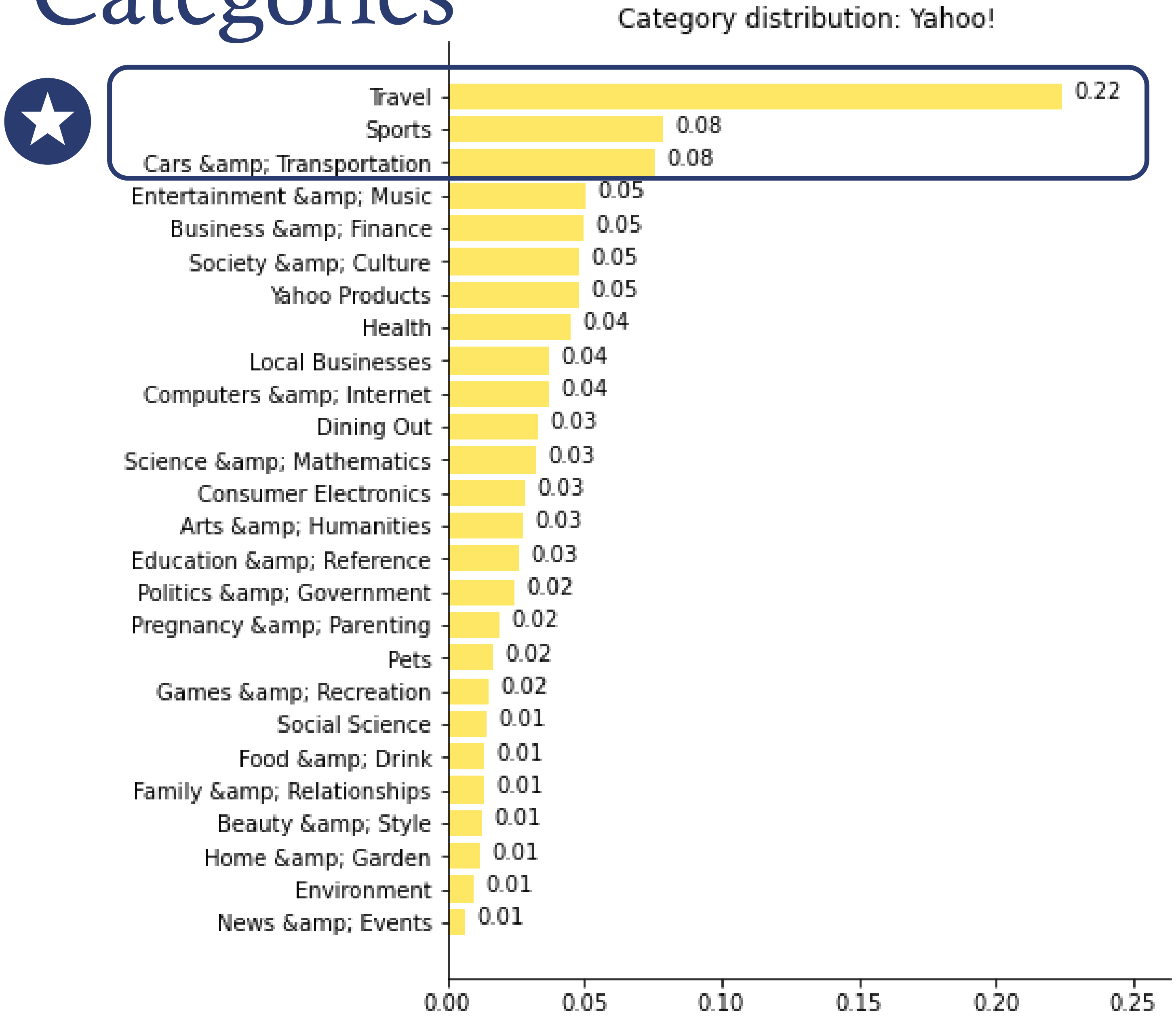

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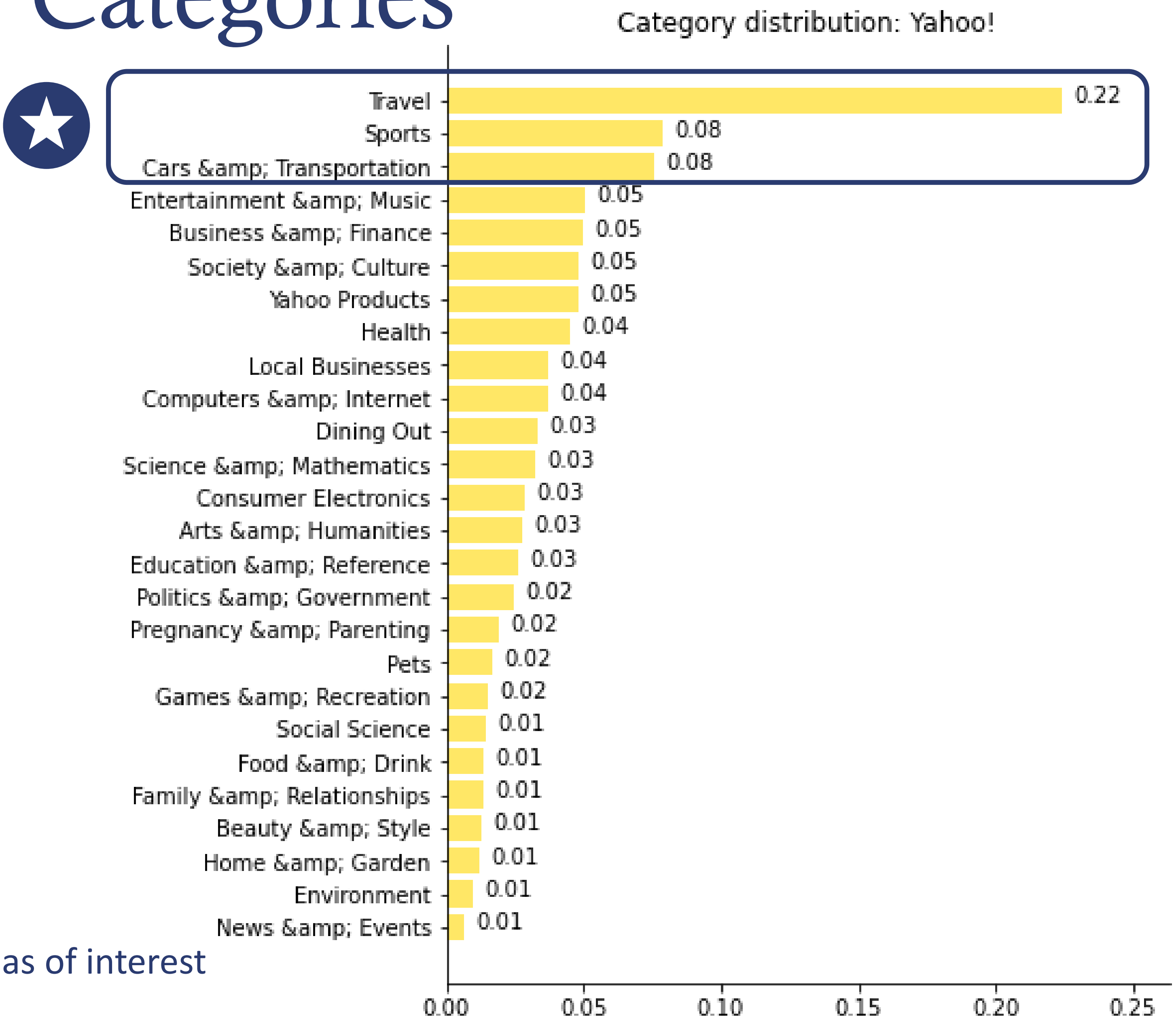
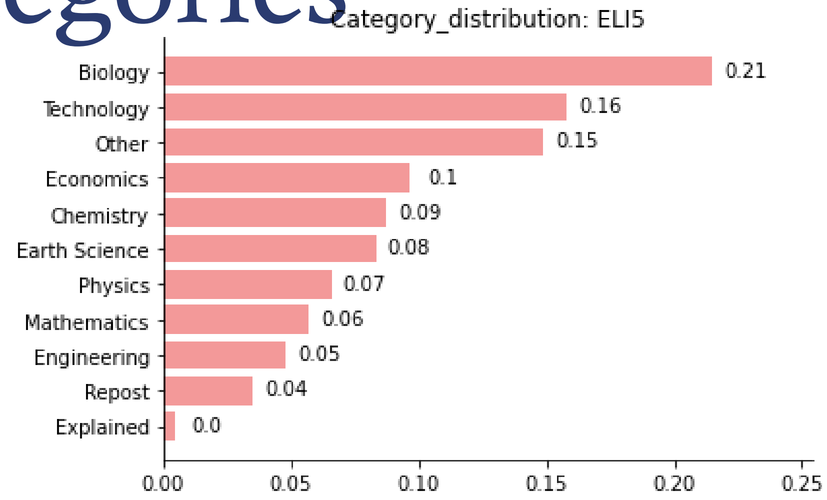
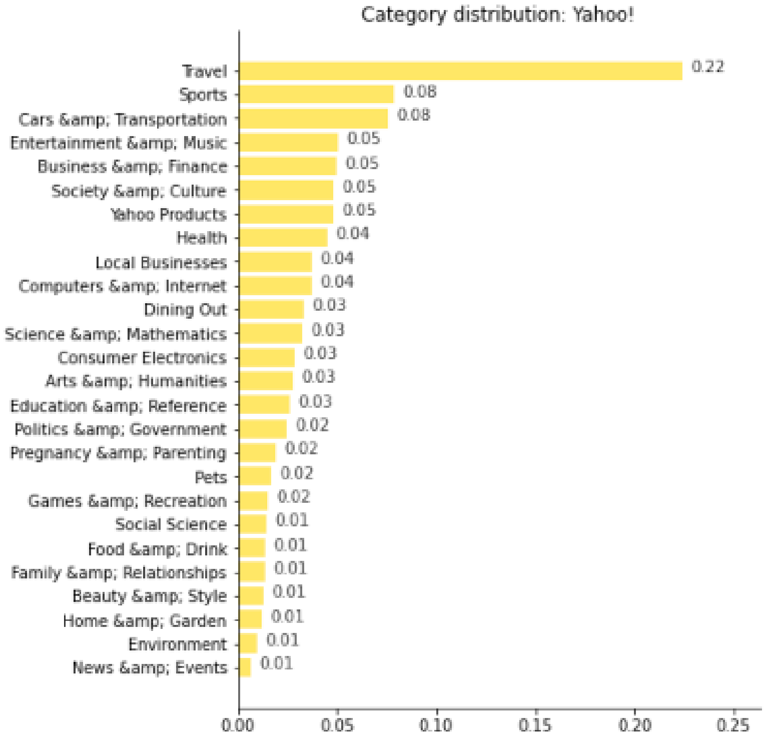
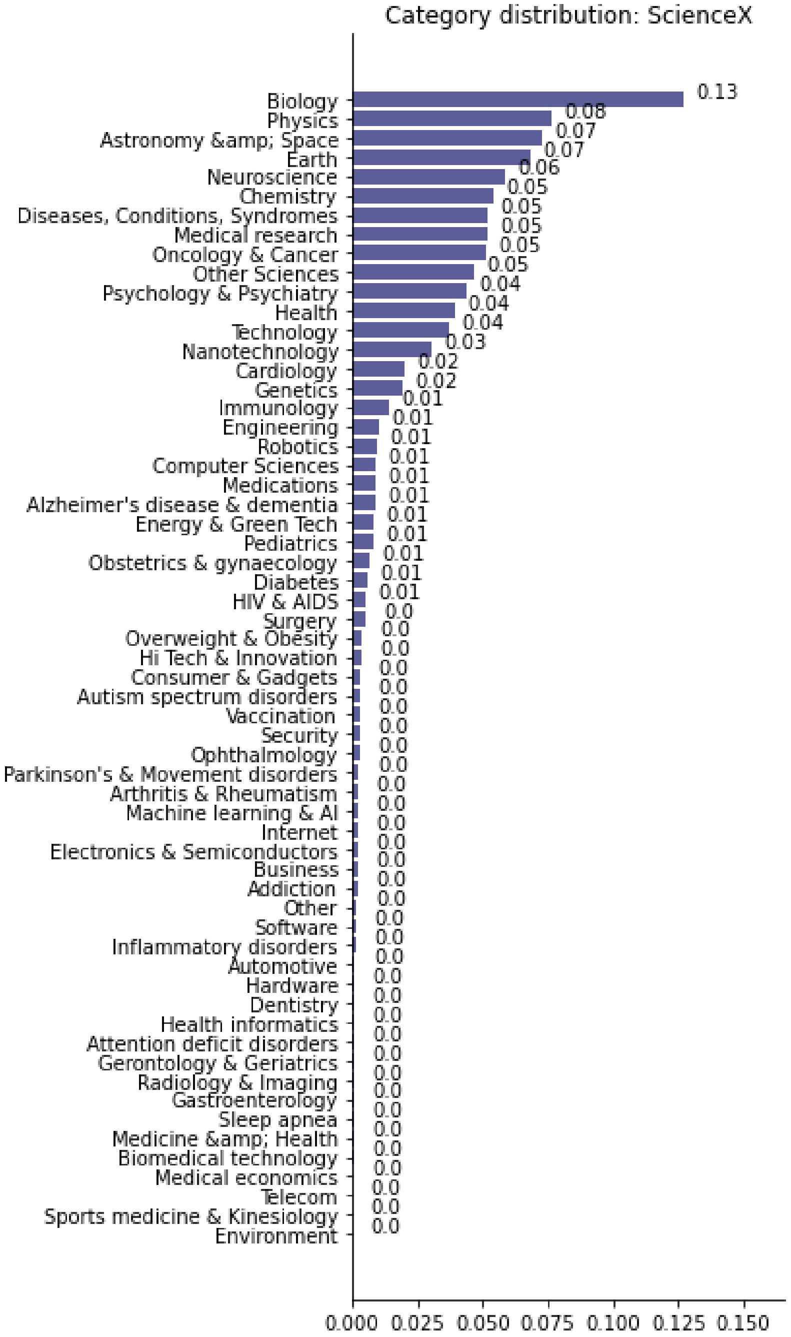


User’s areas of interest

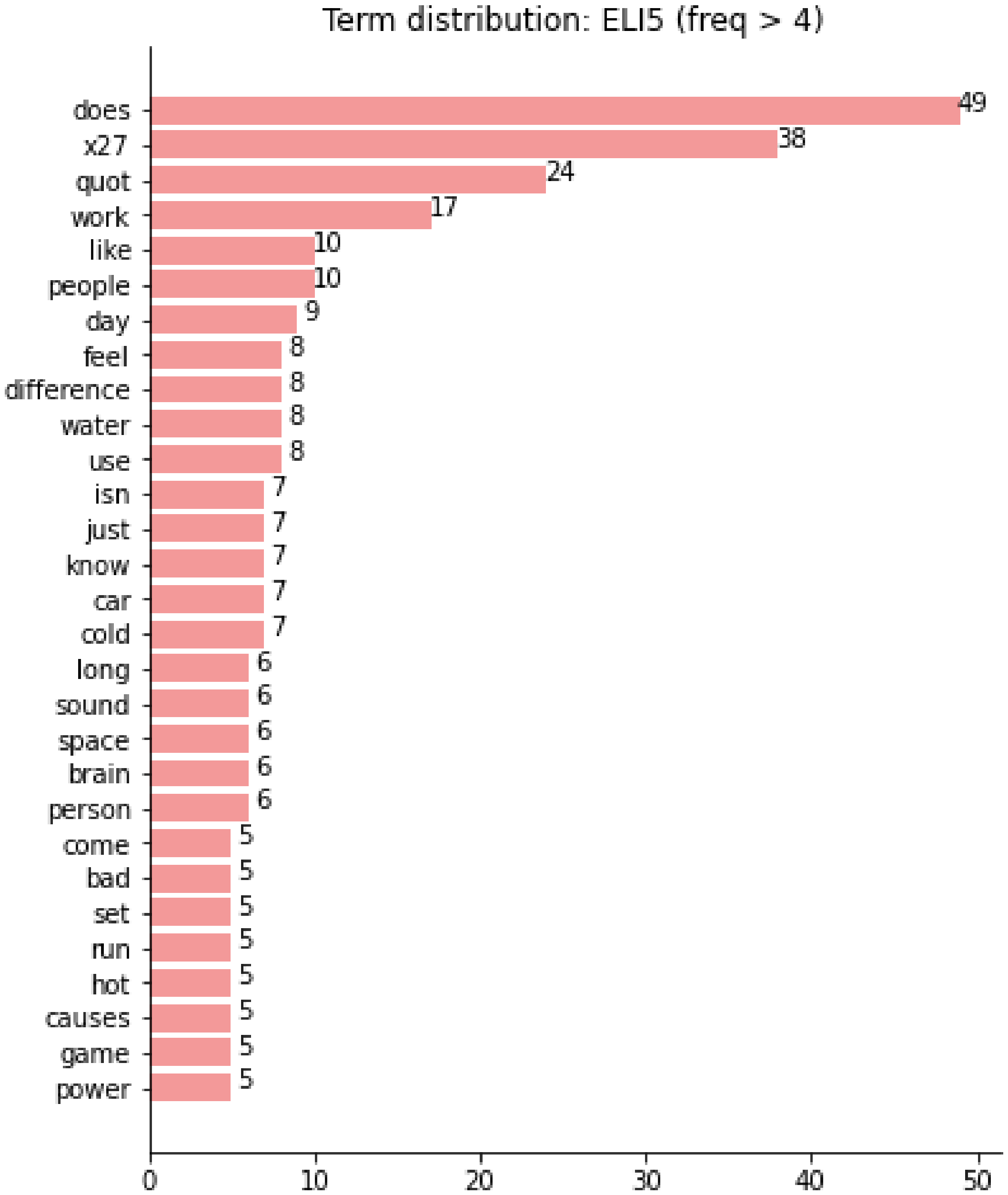
# Results: Categories







# Results: Frequent Terms



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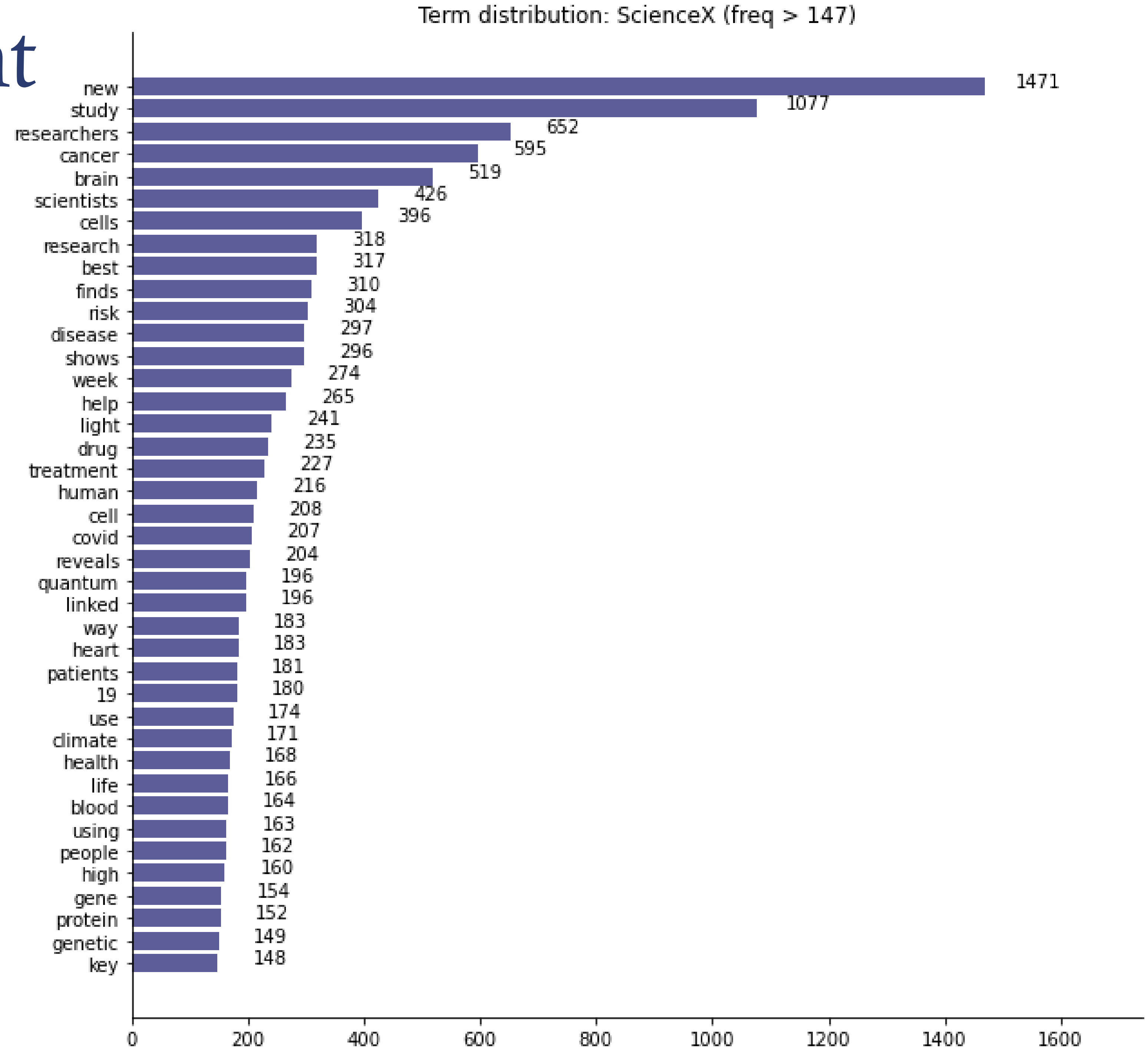

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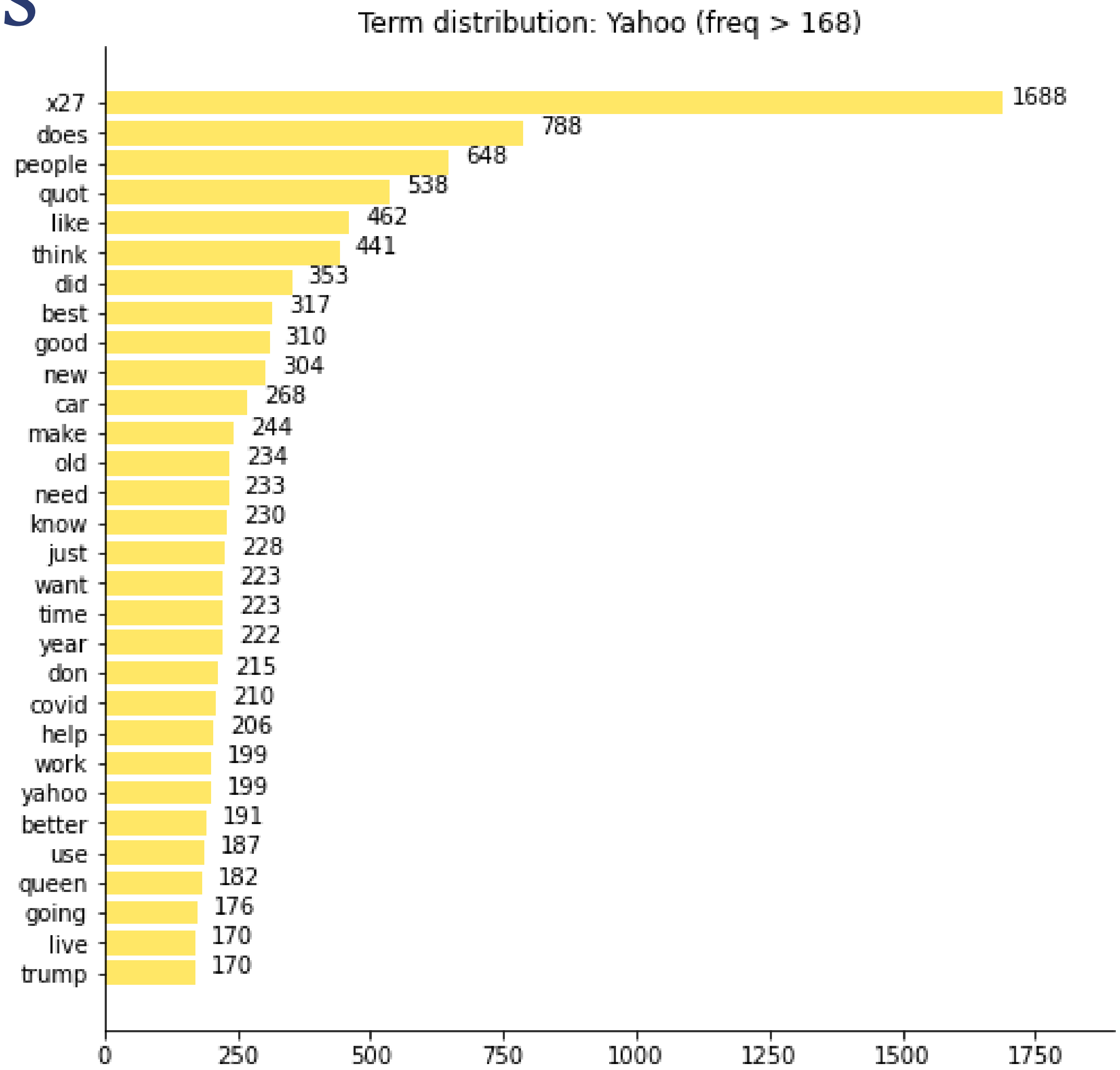

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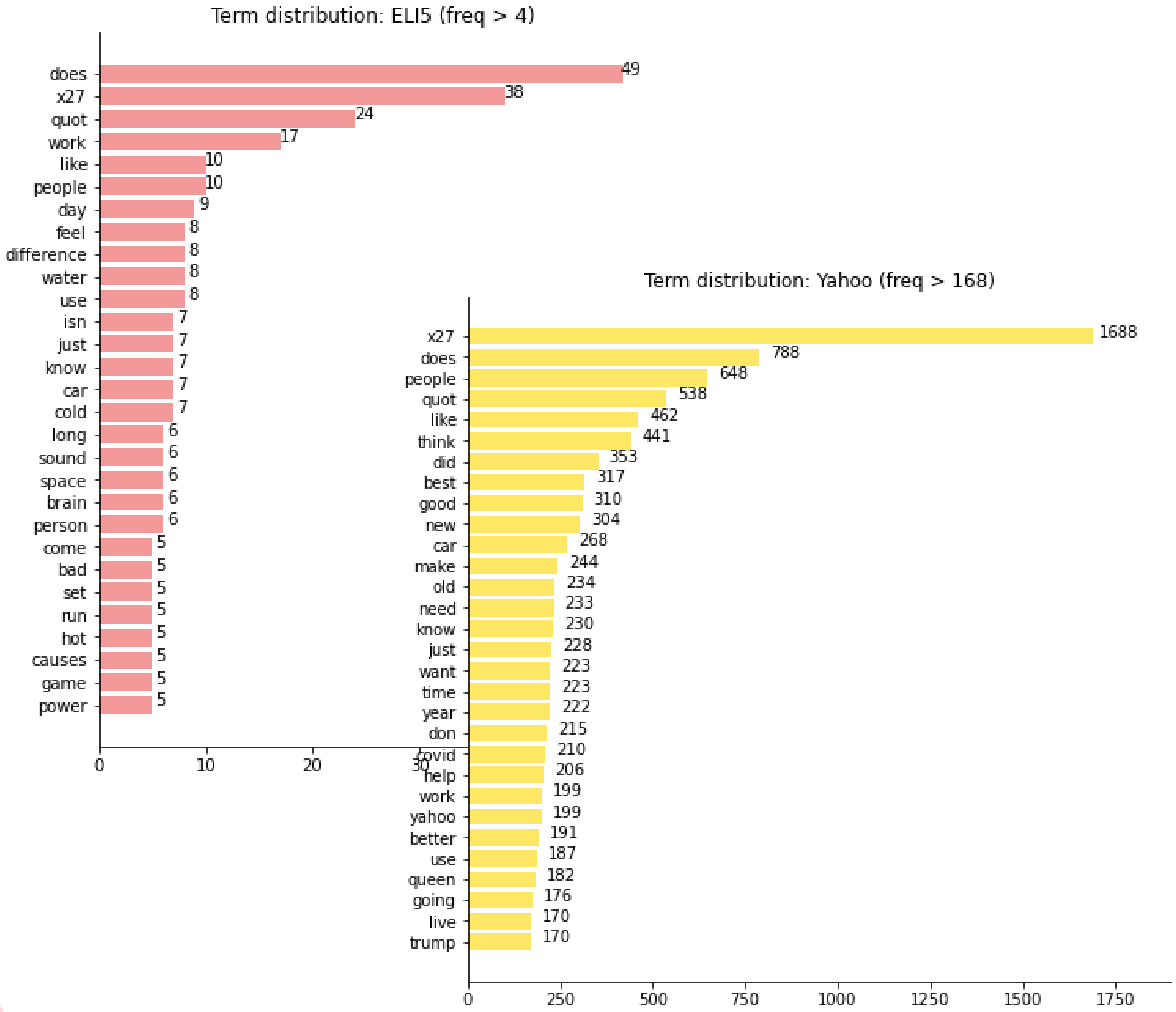

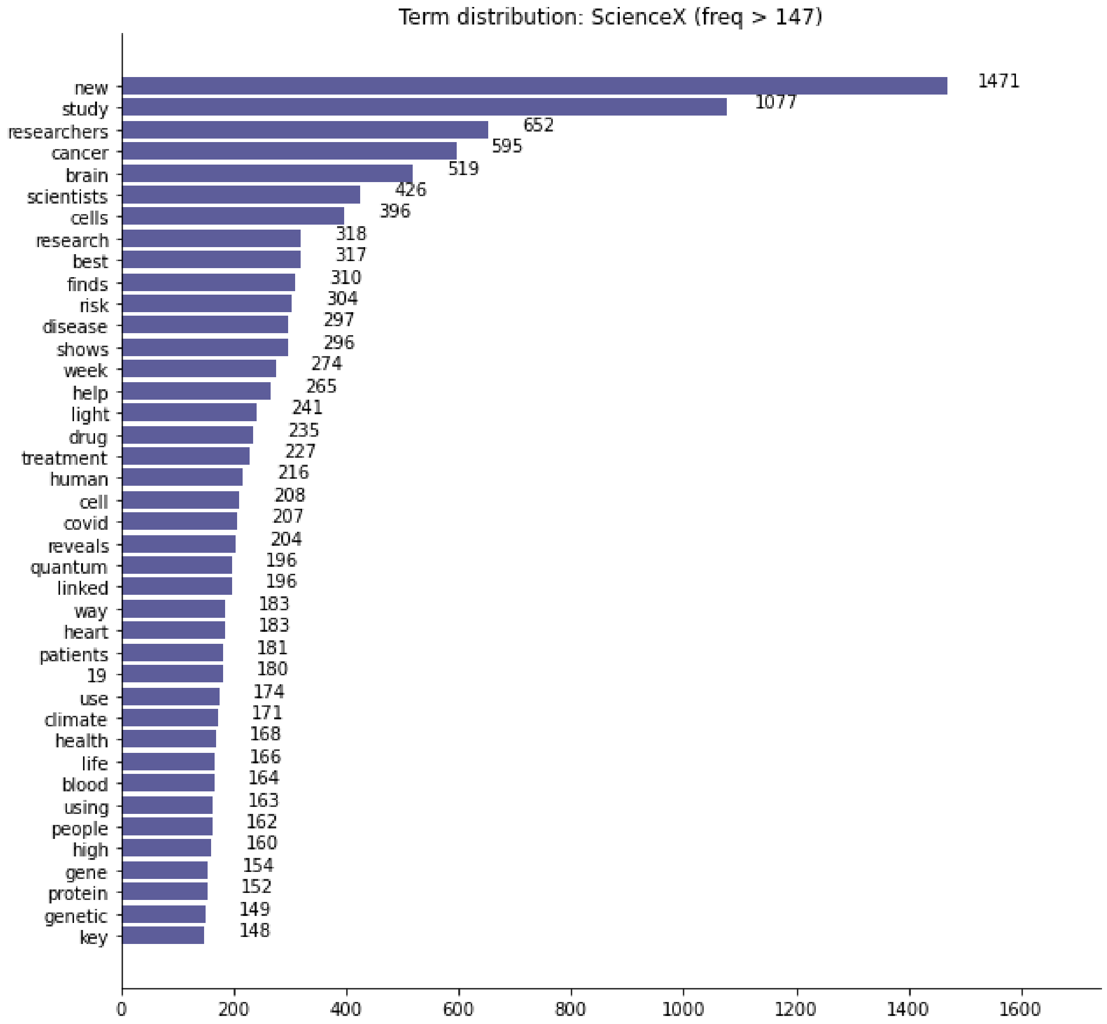

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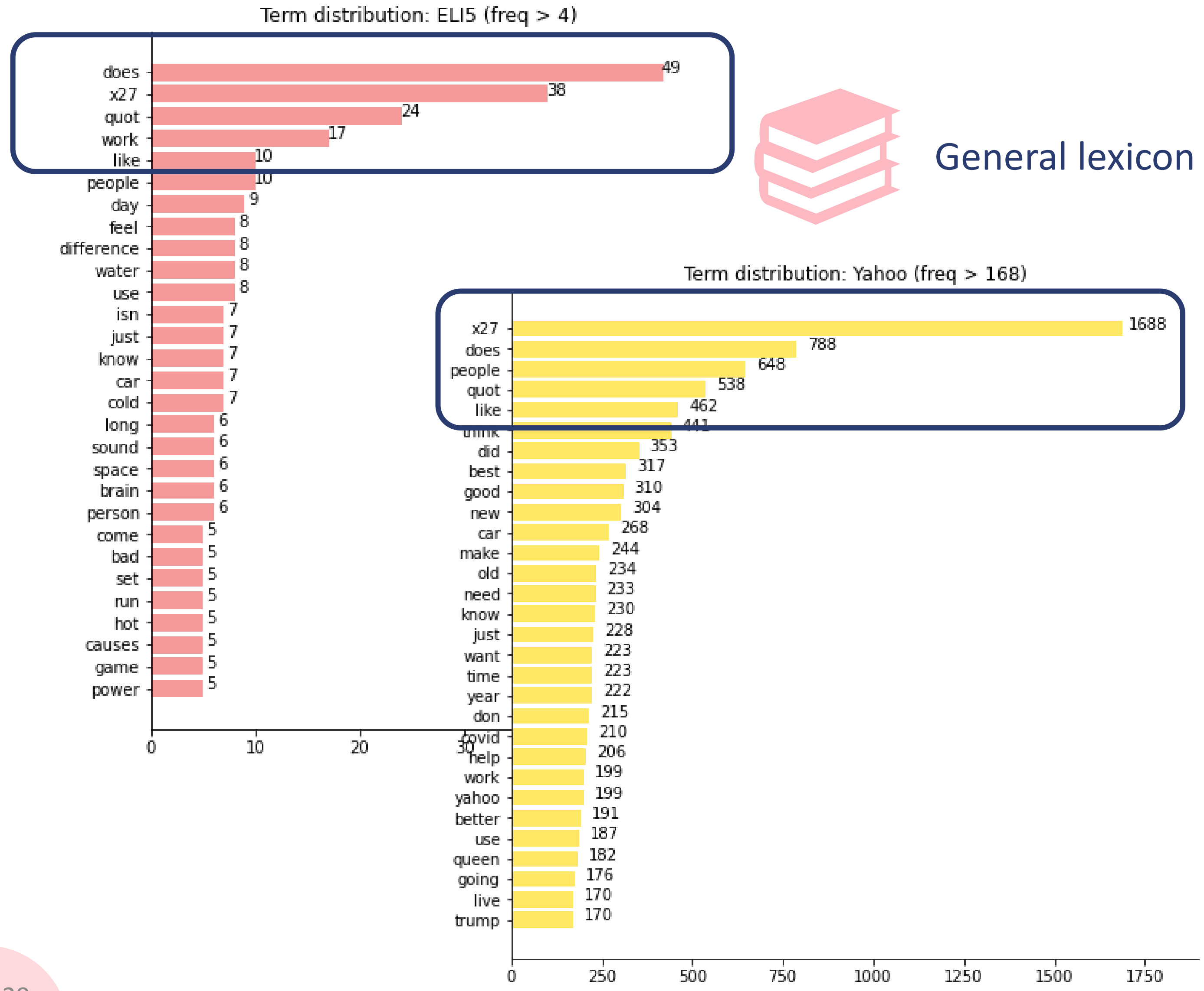

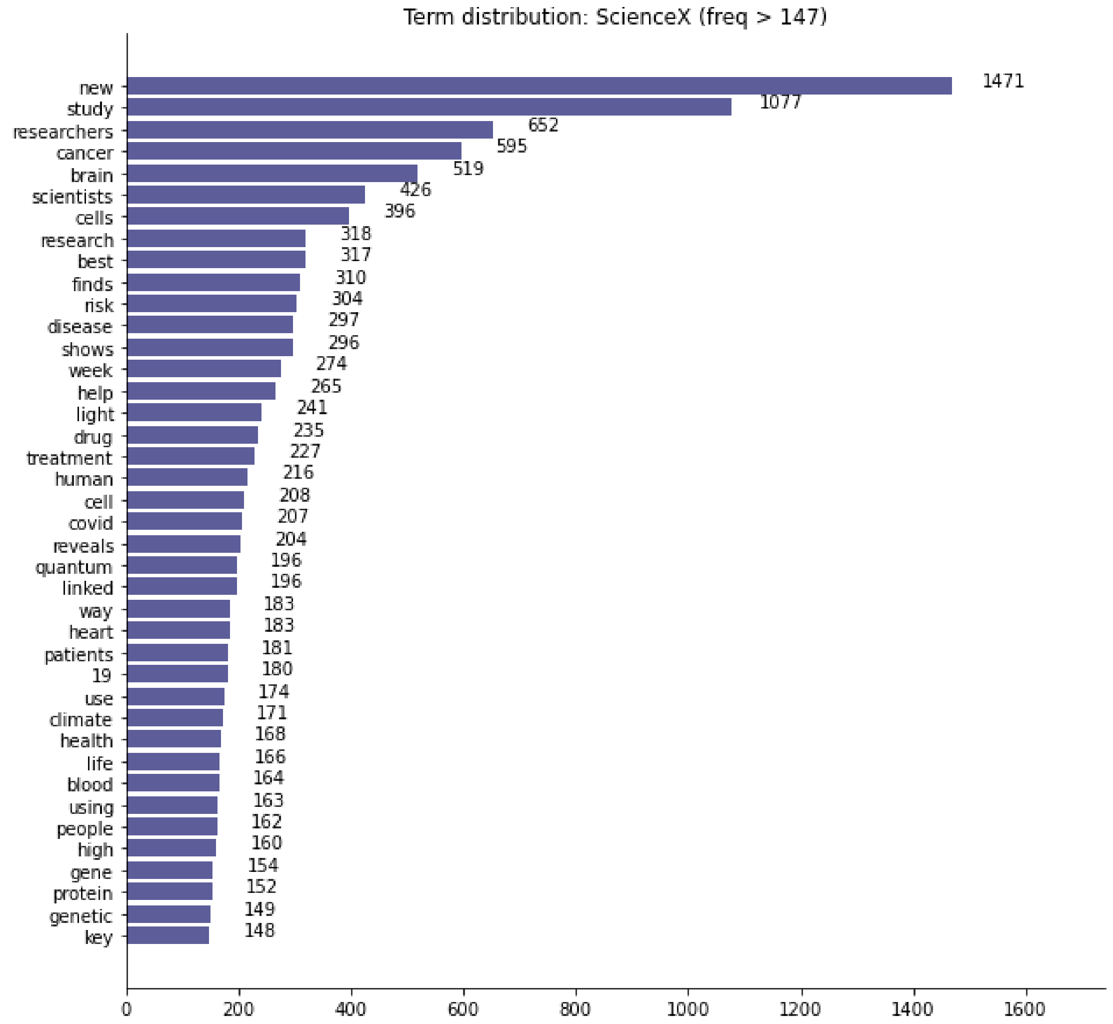

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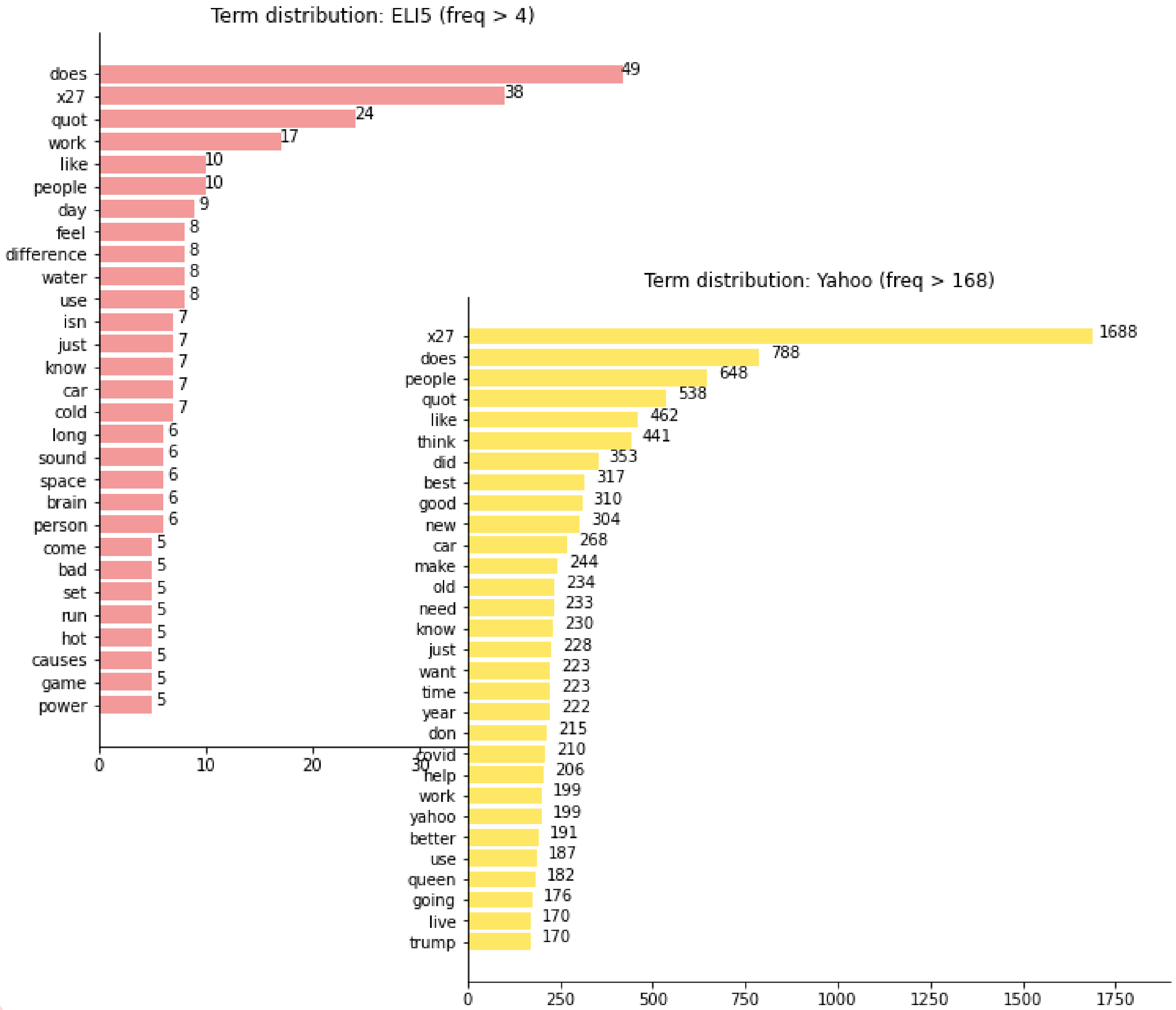
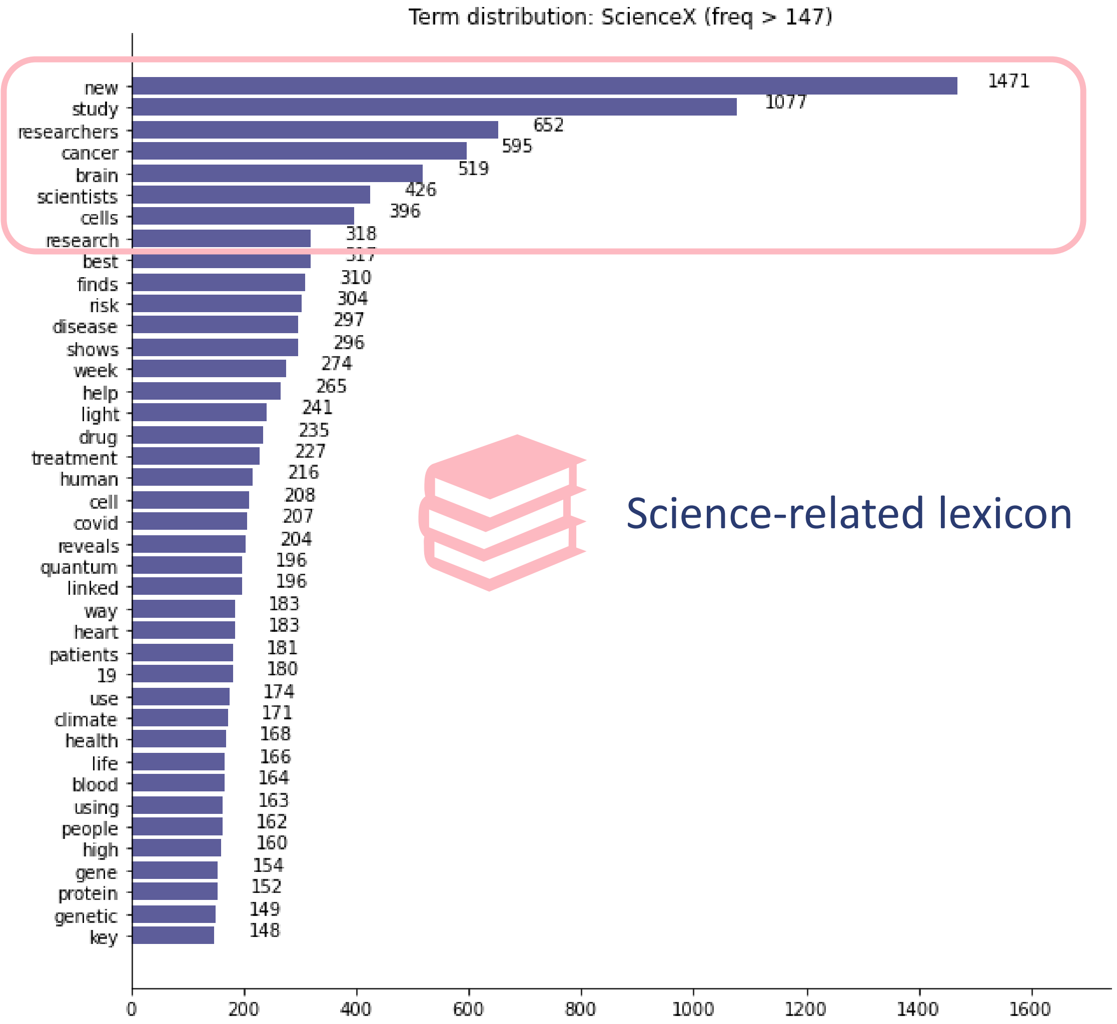




Science-related lexicon

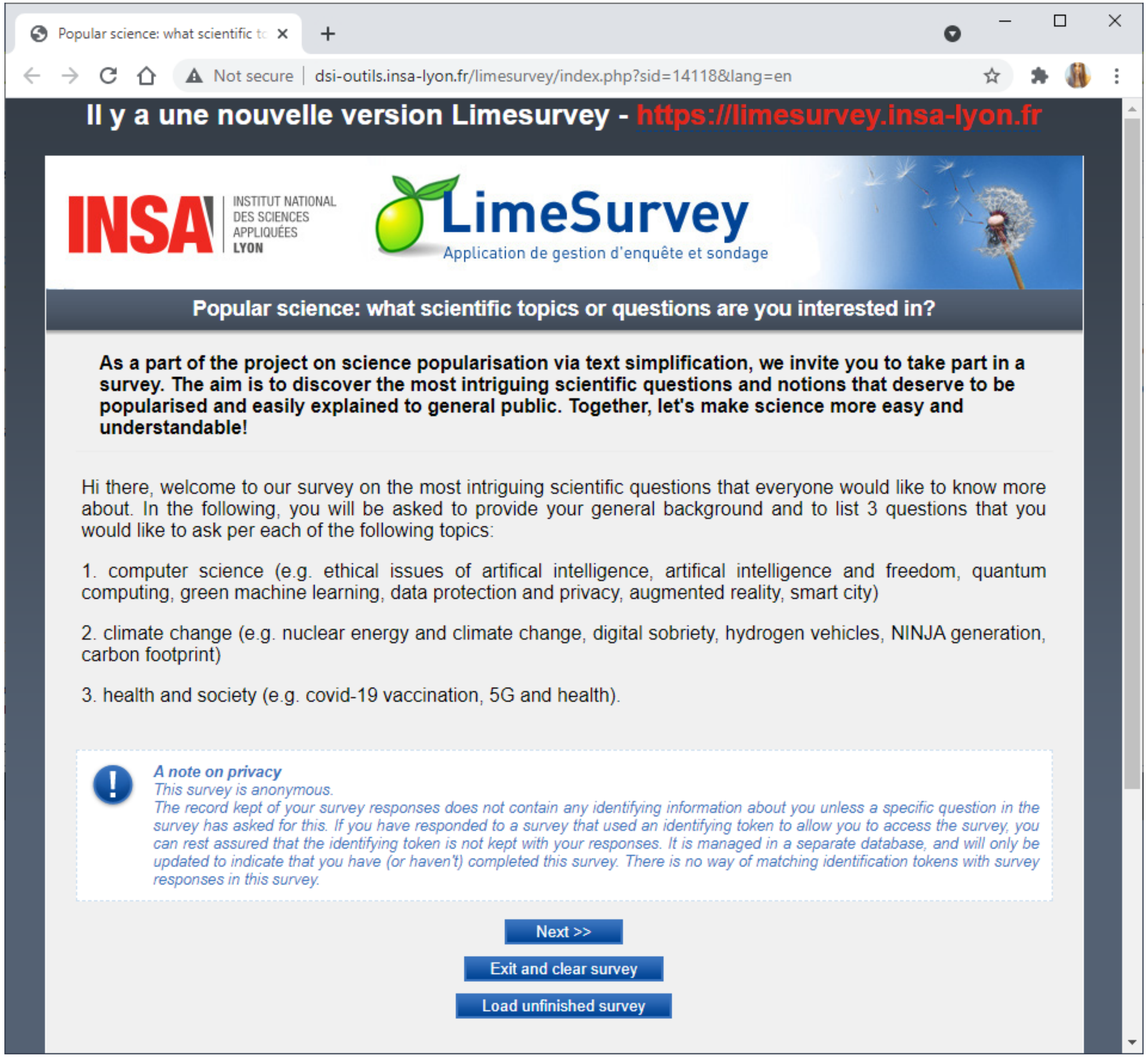
# Survey

# Survey Details

🇬🇧 http://dsi-outils.insa-lyon.fr/limesurvey/index.php?sid=14118&lang=en

🇫🇷 http://dsi-outils.insa-lyon.fr/limesurvey/index.php?sid=14118&lang=fr

⏱ 15 min


Popular science: what scientific t
Not secure | dsi-outils.insa-lyon.fr/limesurvey/index.php?sid=14118&lang=en
INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON
LimeSurvey
Application de gestion d'enquête et sondage
Next >>
Exit and clear survey
Load unfinished survey

**Il y a une nouvelle version Limesurvey - https://limesurvey.insa-lyon.fr**

**Popular science: what scientific topics or questions are you interested in?**

**As a part of the project on science popularisation via text simplification, we invite you to take part in a survey. The aim is to discover the most intriguing scientific questions and notions that deserve to be popularised and easily explained to general public. Together, let's make science more easy and understandable!**

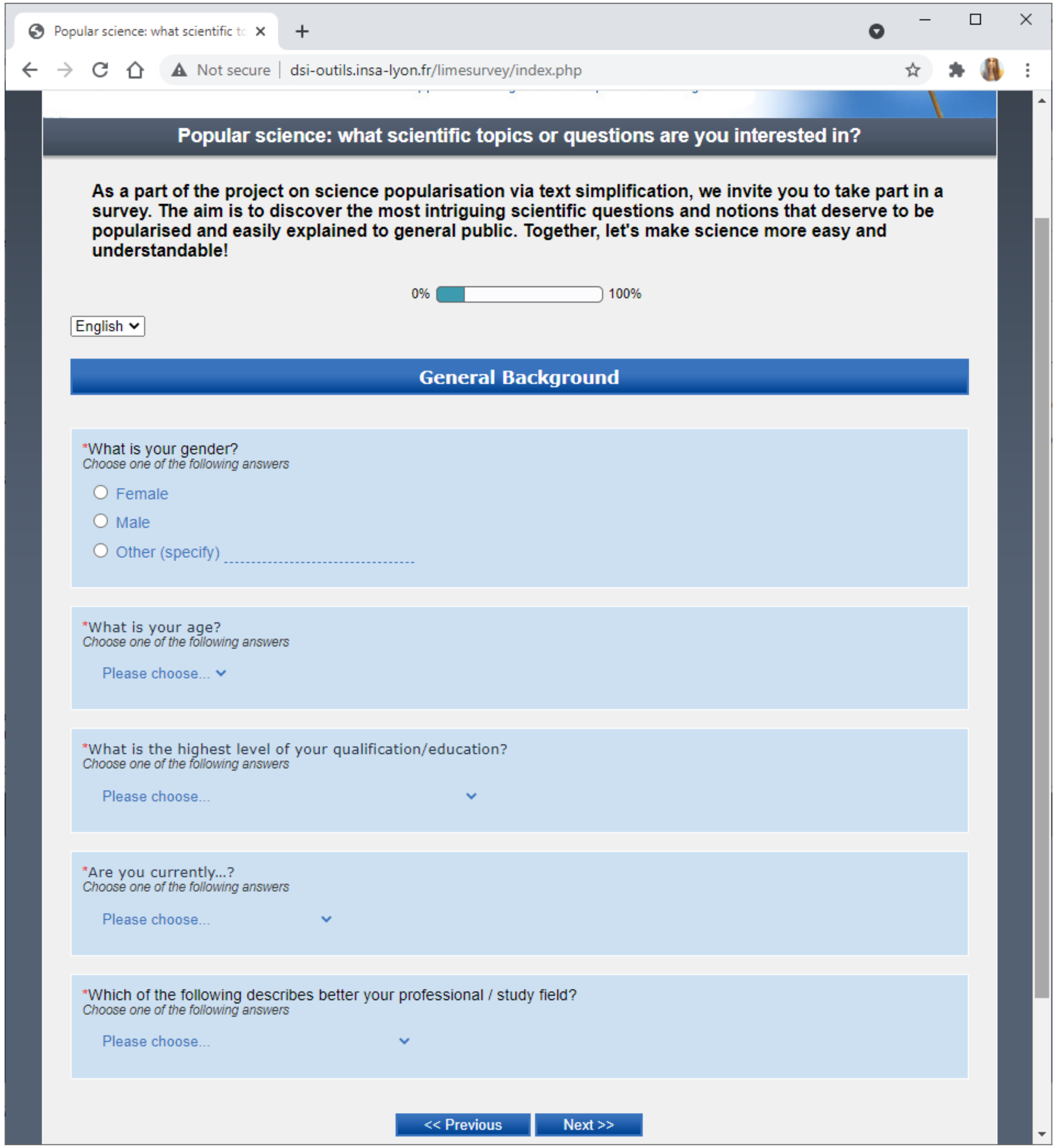
Hi there, welcome to our survey on the most intriguing scientific questions that everyone would like to know more about. In the following, you will be asked to provide your general background and to list 3 questions that you would like to ask per each of the following topics:

1. computer science (e.g. ethical issues of artifical intelligence, artifical intelligence and freedom, quantum computing, green machine learning, data protection and privacy, augmented reality, smart city)
2. climate change (e.g. nuclear energy and climate change, digital sobriety, hydrogen vehicles, NINJA generation, carbon footprint)
3. health and society (e.g. covid-19 vaccination, 5G and health).

***A note on privacy***
*This survey is anonymous.*
*The record kept of your survey responses does not contain any identifying information about you unless a specific question in the survey has asked for this. If you have responded to a survey that used an identifying token to allow you to access the survey, you can rest assured that the identifying token is not kept with your responses. It is managed in a separate database, and will only be updated to indicate that you have (or haven't) completed this survey. There is no way of matching identification tokens with survey responses in this survey.*

# Survey Details

## Part I: General Background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Next >>

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**General Background**

*What is your gender?
*Choose one of the following answers*

○ Female
○ Male
○ Other (specify) ____________

*What is your age?
*Choose one of the following answers*

Please choose...

*What is the highest level of your qualification/education?
*Choose one of the following answers*

Please choose...

*Are you currently...?
*Choose one of the following answers*

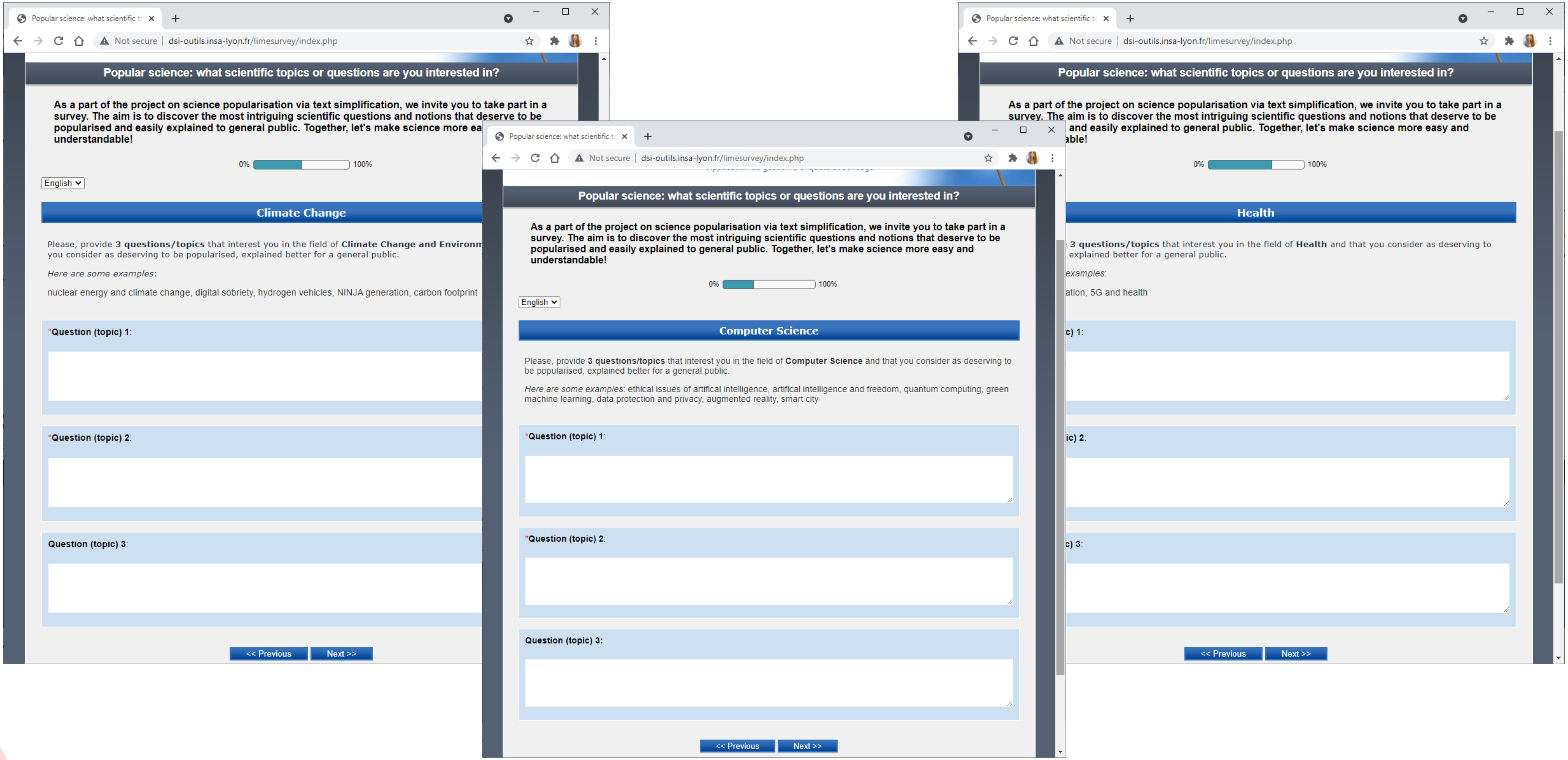
Please choose...

*Which of the following describes better your professional / study field?
*Choose one of the following answers*

Please choose...

# Survey Details

## Part II-IV: Topics per Area



Popular science: what scientific t
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0%
100%
English
<< Previous
Next >>

**Popular science: what scientific topics or questions are you interested in?**

**As a part of the project on science popularisation via text simplification, we invite you to take part in a survey. The aim is to discover the most intriguing scientific questions and notions that deserve to be popularised and easily explained to general public. Together, let's make science more ea**
**understandable!**

**Climate Change**

Please, provide **3 questions/topics** that interest you in the field of **Climate Change and Environm**
you consider as deserving to be popularised, explained better for a general public.

*Here are some examples:*

nuclear energy and climate change, digital sobriety, hydrogen vehicles, NINJA generation, carbon footprint

*Question (topic) 1:

*Question (topic) 2:

Question (topic) 3:

**Popular science: what scientific topics or questions are you interested in?**

**As a part of the project on science popularisation via text simplification, we invite you to take part in a survey. The aim is to discover the most intriguing scientific questions and notions that deserve to be popularised and easily explained to general public. Together, let's make science more easy and understandable!**

**Computer Science**

Please, provide **3 questions/topics** that interest you in the field of **Computer Science** and that you consider as deserving to be popularised, explained better for a general public.

*Here are some examples:* ethical issues of artifical intelligence, artifical intelligence and freedom, quantum computing, green machine learning, data protection and privacy, augmented reality, smart city

*Question (topic) 1:

*Question (topic) 2:

Question (topic) 3:

**Popular science: what scientific topics or questions are you interested in?**

**As a part of the project on science popularisation via text simplification, we invite you to take part in a survey. The aim is to discover the most intriguing scientific questions and notions that deserve to be**
**and easily explained to general public. Together, let's make science more easy and**
**able!**

**Health**

**3 questions/topics** that interest you in the field of **Health** and that you consider as deserving to
explained better for a general public.

*examples:*

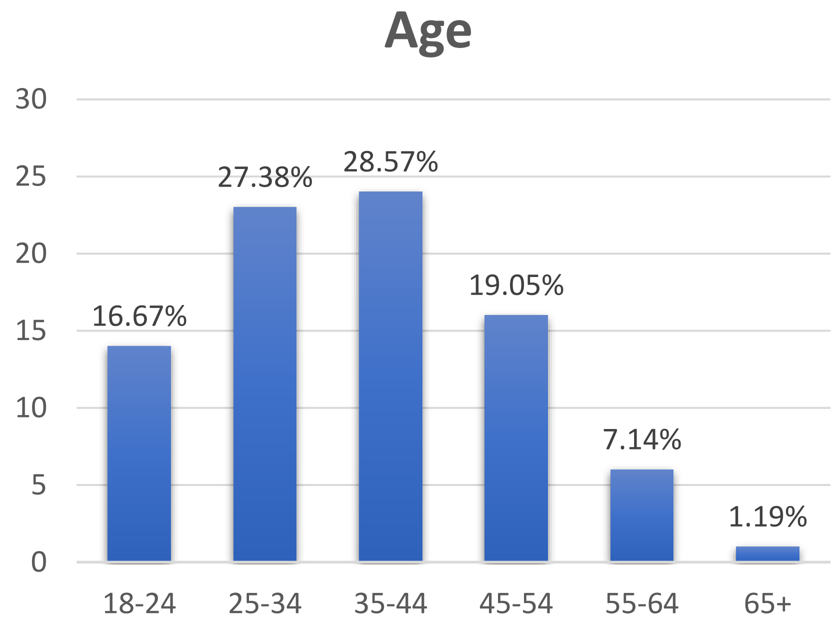
ation, 5G and health

c) 1:

ic) 2:

c) 3:

# Participants



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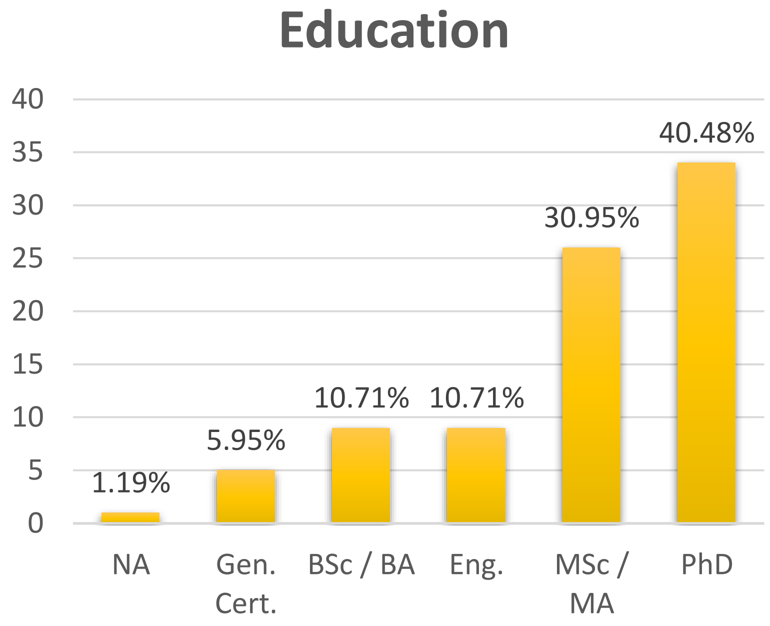
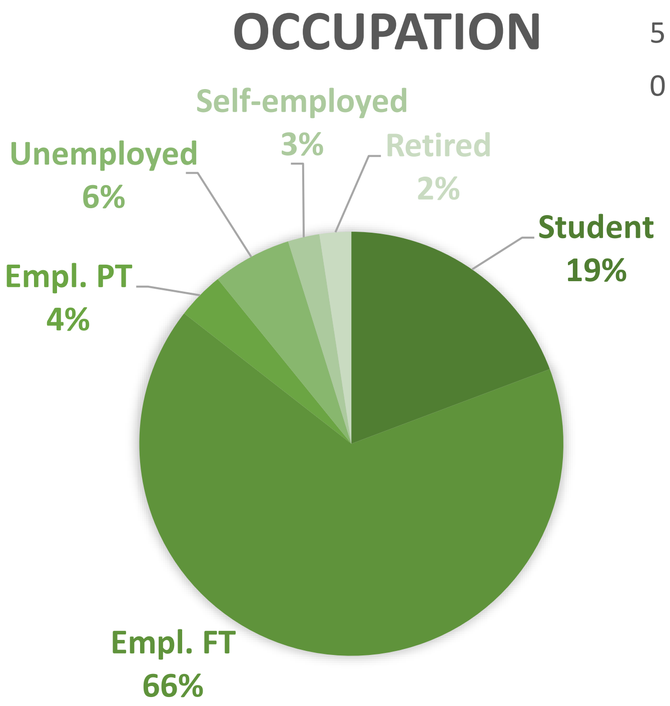
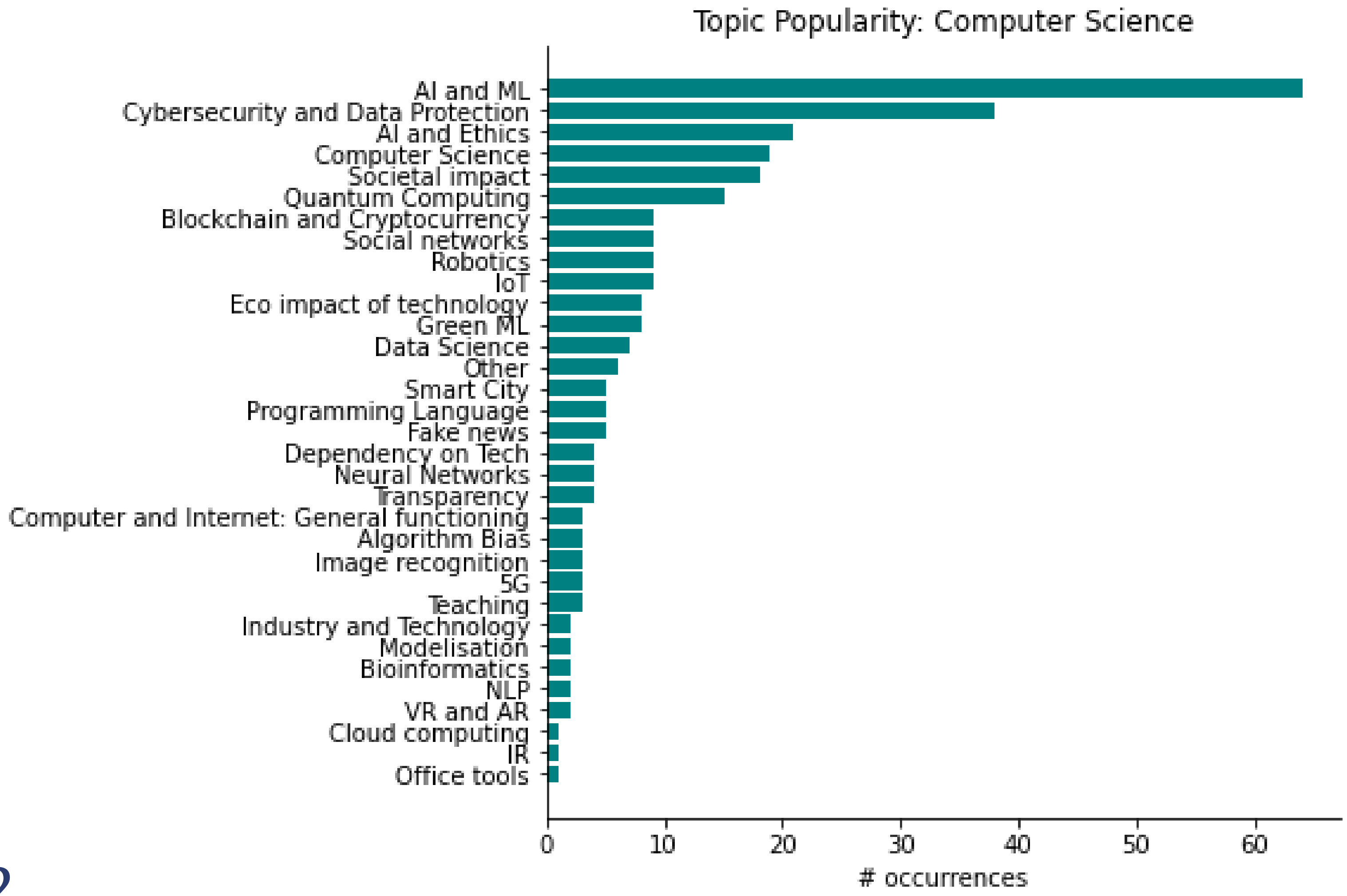




# Computer Science Topics

topics × 33



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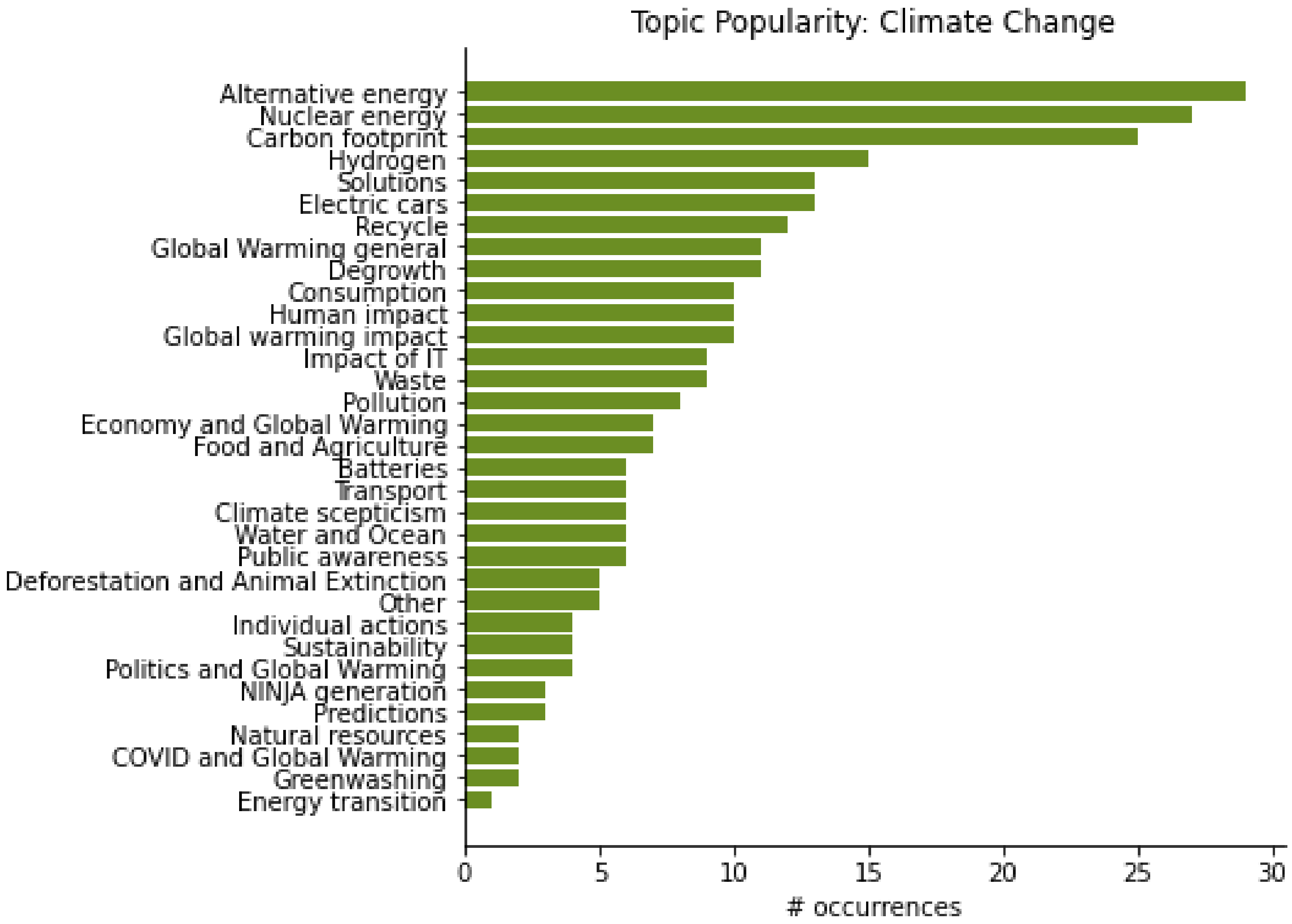
# Climate Change Topics

topics × 33



× 224

# Health Topics

COVID-19: social thread, treatment, vaccination

Mental health

Bacteria *vs.* virus

ML for medcine

Impact of waves on health

Explanation of research methods and propagation of health knowledge

Medical data protection

# Topics by Areas of Study

Human factor
Everyday routine

what are the challenges of “alternative” medicine

How to use Excel for business

Rise of awareness

malnutrition

Addictive use of phones, computers and Internet

Explanations of the key notions and issues

AI: what is it? what can it be used for now? what are the perspectives?

Neural networks

# Conclusions

A gap between users' interest based on their queries *vs.* the expectations of the scientific journalists

Questions about everyday phenomena and general functioning of things → hard to find the answers in scientific publications

"How to… ?"

Simplified text should contain references to people's everyday experience to bridge the science and routine

Biology and Technology are the most popular topics

ScienceX topics ≠ survey results

Professional knowledge reveals the understanding of potential bias and fears related to a domain and affects the choice of topics