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Perception of Personalization Processes: Awareness, Data Sharing and Transparency

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Motivation

Artificial Intelligence based Personalization Market by Application, Technology, and Geography - Forecast and Analysis 2023-2027

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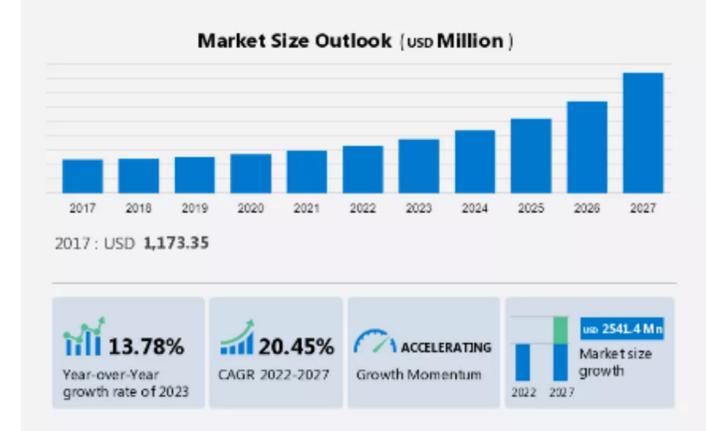
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Artificial Intelligence Based Personalization Market Analysis Forecast 2023-2027

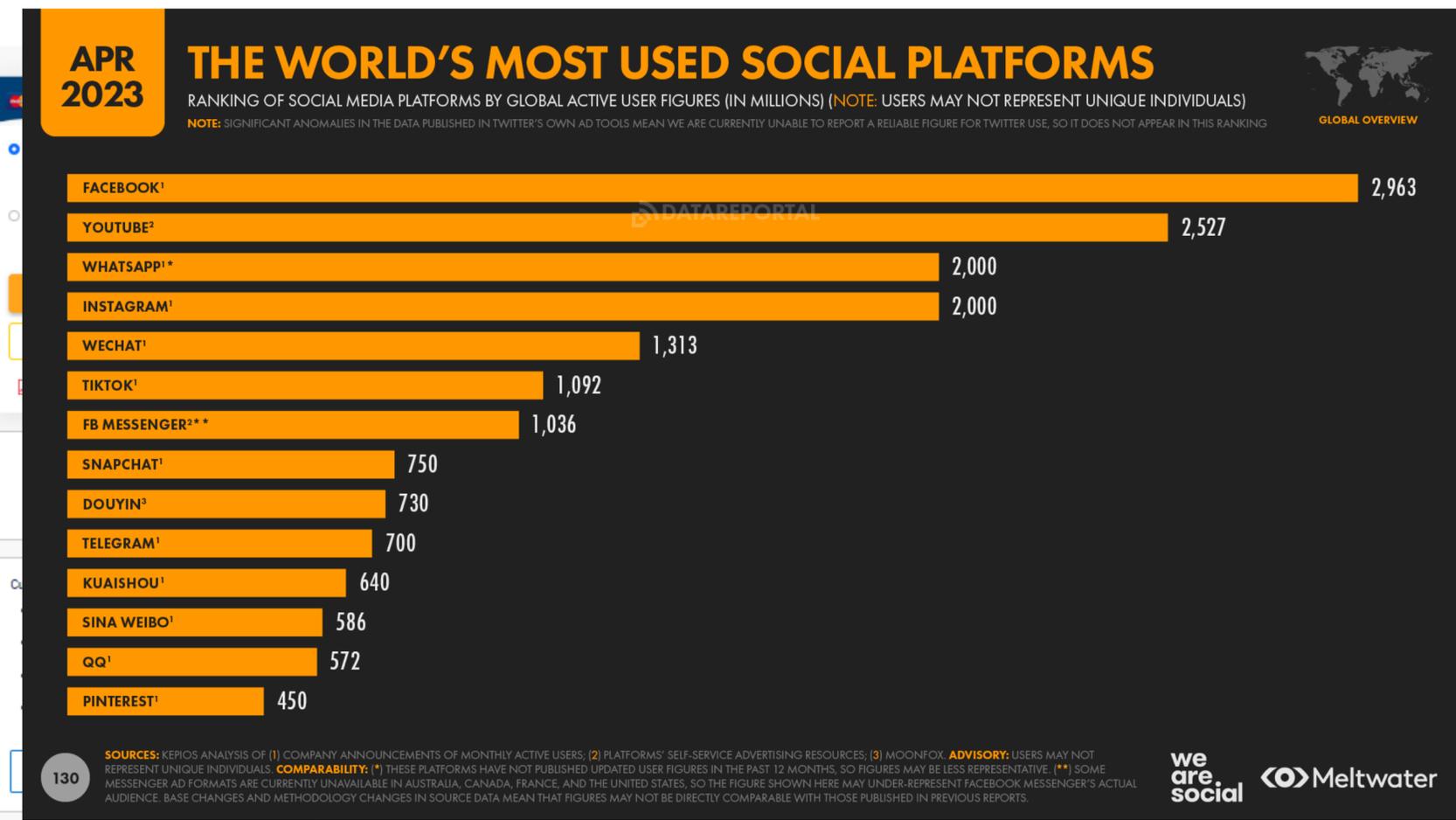
The artificial intelligence-based personalization market size is estimated to grow at a CAGR of 20.45% between 2022 and 2027. The size of the market is forecast to increase by USD 2,541.4 million. The growth of the market depends on several factors, including a high unsubscribe rate for mass marketing, churn prediction, and the increase in the use of chatbots.

This report extensively covers market segmentation by application (website personalization, display ads personalization, social media personalization, e-mail personalization, and others), technology (machine learning, deep learning, and natural language processing), and geography (APAC, North America, Europe, South America, and Middle East and Africa). It also includes an in-depth analysis of drivers, trends, and challenges. Furthermore, the report includes historic market data from 2017 to 2021.

What will be the size of the Artificial Intelligence Based Personalization Market During the Forecast Period?



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The Future of Search: Machine Learning and Personalization [2023]

By Marcel Deer Reviewed by Davor Štefanović

Updated May 15, 2023.



Personalized Information Paths

📄 **Echo chambers and filter bubbles:** users are provided with content that perpetuate their own beliefs and attitudes

Contribute to confirmation, increased polarization and fragmentation of the society

Modeling echo chambers and polarization dynamics in social networks

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Echo chambers and opinion polarization recently quantified in several sociopolitical contexts and across different social media, raise concerns on their potential impact on the spread of misinformation and on openness of debates. Despite increasing efforts, the dynamics leading to the emergence of these phenomena stay unclear. We propose a model that introduces the dynamics of radicalization, as a reinforcing mechanism driving the evolution to extreme opinions from moderate initial conditions. Inspired by empirical findings on social interaction dynamics, we consider agents characterized by heterogeneous activities and homophily. We show that the transition between a global consensus and emerging radicalized states is mostly governed by social influence and by the controversialness of the topic discussed. Compared with empirical data of polarized debates on Twitter, the model qualitatively reproduces the observed relation between users' engagement and opinions, as well as opinion segregation in the interaction network. Our findings shed light on the mechanisms that may lie at the core of the emergence of echo chambers and polarization in social media.



Bursting filter bubbles in a digital age: Opening minds and reducing opinion polarization through digital platforms

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ABSTRACT

Filter Bubbles, exacerbated by use of digital platforms, have accelerated opinion polarization. This research builds on calls for interventions aimed at preventing or mitigating polarization. This research assesses the extent that an online digital platform, intentionally displaying two sides of an argument with methodology designed to "open minds" and aid readers willingness to consider an opposing view. This "open mindedness" can potentially penetrate online filter bubbles, alleviate polarization and promote social change in an era of exponential growth of discourse via digital platforms.

Utilizing "The Perspective" digital platform, 400 respondents were divided into five distinct groups varying in number of articles reading material related to "Black Lives Matter" (BLM). Results indicate that those reading five articles, either related or unrelated to race, were significantly more open-minded towards BLM than the control group. Those who read five race-related articles also showed significantly reduced levels of holding a hardliner opinion towards BLM than control.



Increasing diversity in personalization

Auditing YouTube's Recommendation Algorithm for Misinformation Filter Bubbles

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BRANISLAV PECHER, Faculty of Information Technology, Brno University of Technology, Czechia
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JURAJ PODROUZEK, ADRIAN GAVORNIK, and MARIA BIELI
Intelligent Technologies, Slovakia

In this article, we present results of an auditing study performed over YouTube fast a user can get into a misinformation filter bubble, but also what it takes to break the bubble enclosure. We employ a sock puppet audit methodology, in which participants (as YouTube users) delve into misinformation filter bubbles by watching misinformation. Then they try to burst the bubbles and reach more balanced recommendation by watching debunking content. We record search results, home page results, and recommended videos. Overall, we recorded 17,405 unique videos, out of which we manually annotated a subset of misinformation. The labeled data was used to train a machine learning model to classify videos into classes (promoting, debunking, neutral) with the accuracy of 0.82. We use the remaining videos that would not be feasible to annotate manually.

International Journal of Data Science and Analytics (2023) 16:255–269
<https://doi.org/10.1007/s41060-022-00354-9>

REGULAR PAPER

Pull–push: a measure of over- or underpersonalization in recommendation

Gebre Kirstos G. Gebremeskel¹ · Arjen P. de Vries¹

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Abstract

A recommender system imposes differences between users, by presenting to them different recommendations. This results in different “reaction” lists. Comparison of the differences in the recommendations can indicate different user states. Users can approve the imposed difference, end up narrowing the difference between them (pulling each other closer) by consuming more of the items in common or enlarge the difference between them (pushing each other further apart) by consuming the items not in common. When users do not approve the differences, they are either in a push state (implicitly disapproving under-personalization) or in a pull state (implicitly disapproving over-personalization). We offer the pull–push metric to quantify the magnitude of pull or push—measures of disapproval by the users of, respectively, over-personalization and under-personalization. Application on simulated datasets shows that users can push each other away up to disjoint sets or pull each other closer up to identical sets. On real-world datasets, we find that the particular recommender system was under-personalizing its recommendations. We show how the pull–push metric can be merged with another metric of personalization to come up with a measure of the potential for improvement in a recommender system and discuss its relationship to popularity bias.

Understanding and Controlling the Filter Bubble through Interactive Visualization: A User Study

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ABSTRACT

The “filter bubble” is a term which refers to people getting encapsulated in streams of data such as news or social network updates that are personalized to their interests. While people need protection from information overload and maybe prefer to see content they feel familiar or agree with, there is the danger that important issues that should be of concern for everyone will get filtered away and people will lack exposure to different views, living in “echo-chambers”, blissfully unaware of the reality. We have proposed a design of an interactive visualization, which provides the user of a social networking site with awareness of the personalization mechanism (the semantics and the source of the content that is filtered away), and with means to control the filtering mechanism. The visualization has been implemented in a peer-to-peer social network, called MADMICA, and we present here the results of a large scale lab study with 163 crowd-sourced

[1]. Nearly a quarter (24 %) of the content that is shared on the internet is shared on Facebook [2] and more than 3.5 billion pieces of content are shared each week [3], creating a stream of data that can overload any user. The social data overload problem is commonly solved by filtering out the irrelevant data. Personalized stream filtering mechanisms can reduce information overload by presenting the user with only the content deemed to be the most relevant. Some of the major social media sites, such as Facebook, Digg and YouTube, have already implemented personalized stream filtering.

Paradoxically, the main problem with information filtering algorithms is that they could be “too good”. The high level of optimization to the scope of interests of the user, inferred by these algorithms from the user’s previous behavior, leads to users becoming encapsulated in the “bubble” of their comfort, seeing only content related to their interests and being aware of

Previous Work

JOURNAL OF COMPUTER-MEDIATED COMMUNICATION

Journal of Computer-Mediated Communication

CHI 2019 Paper

CHI 2019, May 4–9, 2019, Glasgow, Scotland, UK

Confirmation Bias in Online Searches: Impacts of Selective Exposure Before an Election on Political Attitude Strength and Shifts

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Improving Fairness in Machine Learning Systems: What Do Industry Practitioners Need?

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ABSTRACT

The potential for machine learning (ML) systems to amplify social inequities and unfairness is receiving increasing popular and academic attention. A surge of recent work has focused on the development of algorithmic tools to assess and mitigate such unfairness. If these tools are to have a positive impact on industry practice, however, it is crucial

KEYWORDS

algorithmic bias, fair machine learning, product teams, need-finding, empirical study, UX of machine learning

ACM Reference Format:

Kenneth Holstein, Jennifer Wortman Vaughan, Hal Daumé III, Miroslav Dudik, and Hanna Wallach. 2019. Improving Fairness in Machine Learning Systems: What Do Industry Practitioners Need? In CHI

Patterns

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Article

Perception of fairness in algorithmic decisions: Future developers' perspective

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THE BIGGER PICTURE Fairness, accountability, transparency, and ethics (FATE) in algorithmic systems is gaining a lot of attention lately. With the continuous advancement of machine learning and artificial intelligence, research and tech companies are coming across incidents where algorithmic systems are making non-objective decisions that may reproduce and/or amplify social stereotypes and inequalities. There is a great effort by the research community on developing frameworks of fairness and algorithmic models to alleviate biases; however, we first need to understand how people perceive the complex construct of algorithmic fairness. In this work, we investigate how young and future developers perceive these concepts. Our results can inform future research on (1) understanding perceptions of algorithmic FATE, (2) highlighting the needs for systematic training and education on FATE, and (3) raising awareness among young developers on the potential impact that the systems they are developing have in society.

There are only few studies that looked into how frequent users of the web perceive personalization processes



Research Questions

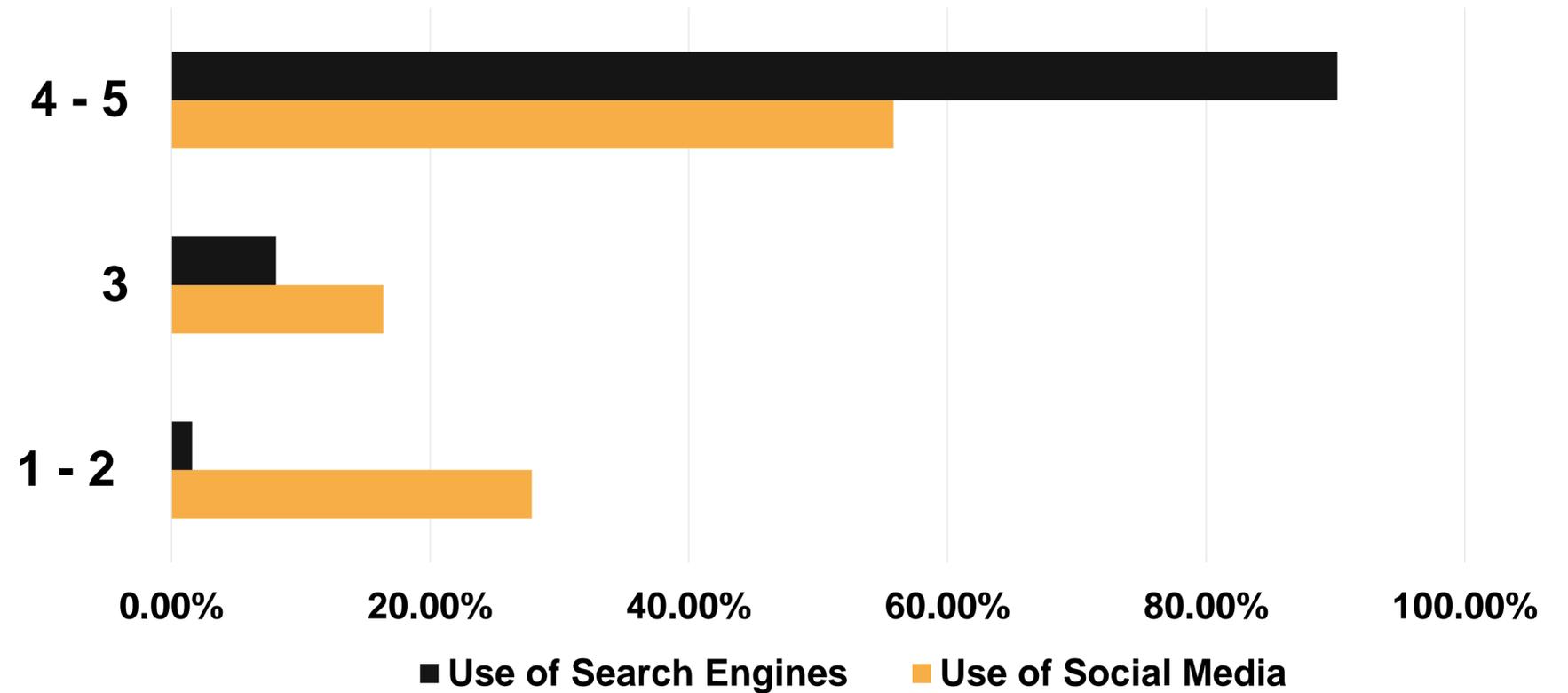
- ❏ How users are perceiving personalization in information access systems, especially when algorithms are guiding them into filter bubbles?
- ❏ What is their view on the use of their personal data for personalization?
- ❏ How it affects their trust to an information access system?
- ❏ Does the opacity of personalization algorithms affect their attitude towards personalization?

Methodology

Online Survey Study

Participants: 61 Active members of online communities

Gender: 14 Female , 1 other



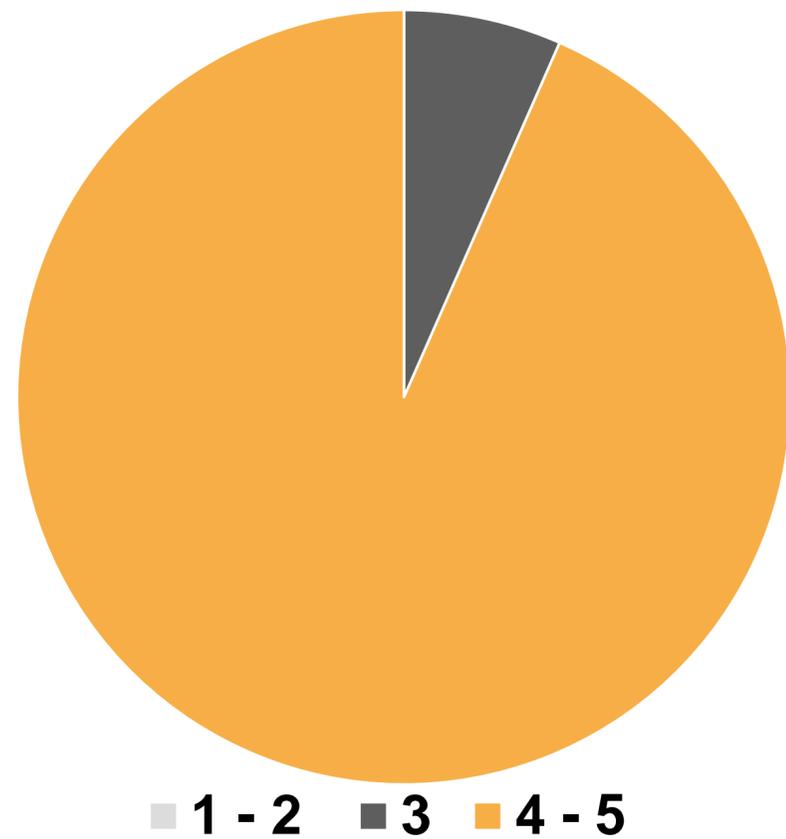
Age	Per.	Specialization	Per.	Education Level	Per.
18 >	1.6%	Economics and Management	14.8%	School Student	3.3%
19 -25	14.8%	Health Sciences	11.5%	Undergraduate Student	11.5%
26 - 35	41 %	Humanities & Social Sciences	18%	Masters Graduate	27.9%
36 - 50	29.5%	Maths& Physical Sciences	16.4%	PhD Graduate	8.2%
51 <	11.5 %	Technological Sciences	29.5%	College/University Graduate	42.6%
				High School Graduate	6.6%

Table 1. Participants' Demographics

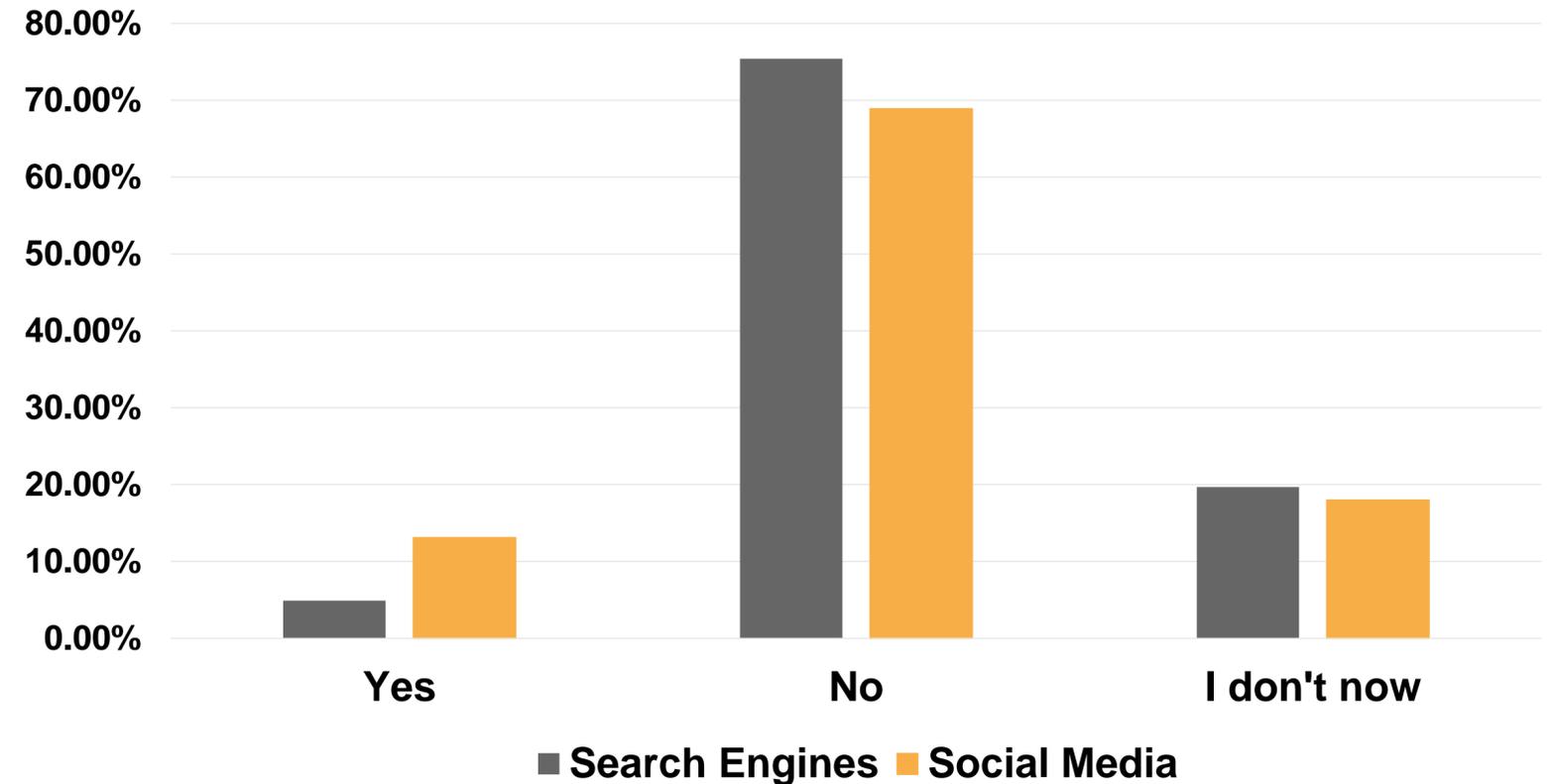


Results: Awareness of Algorithmic Processes

Almost all applications that we use daily are driven by an algorithm

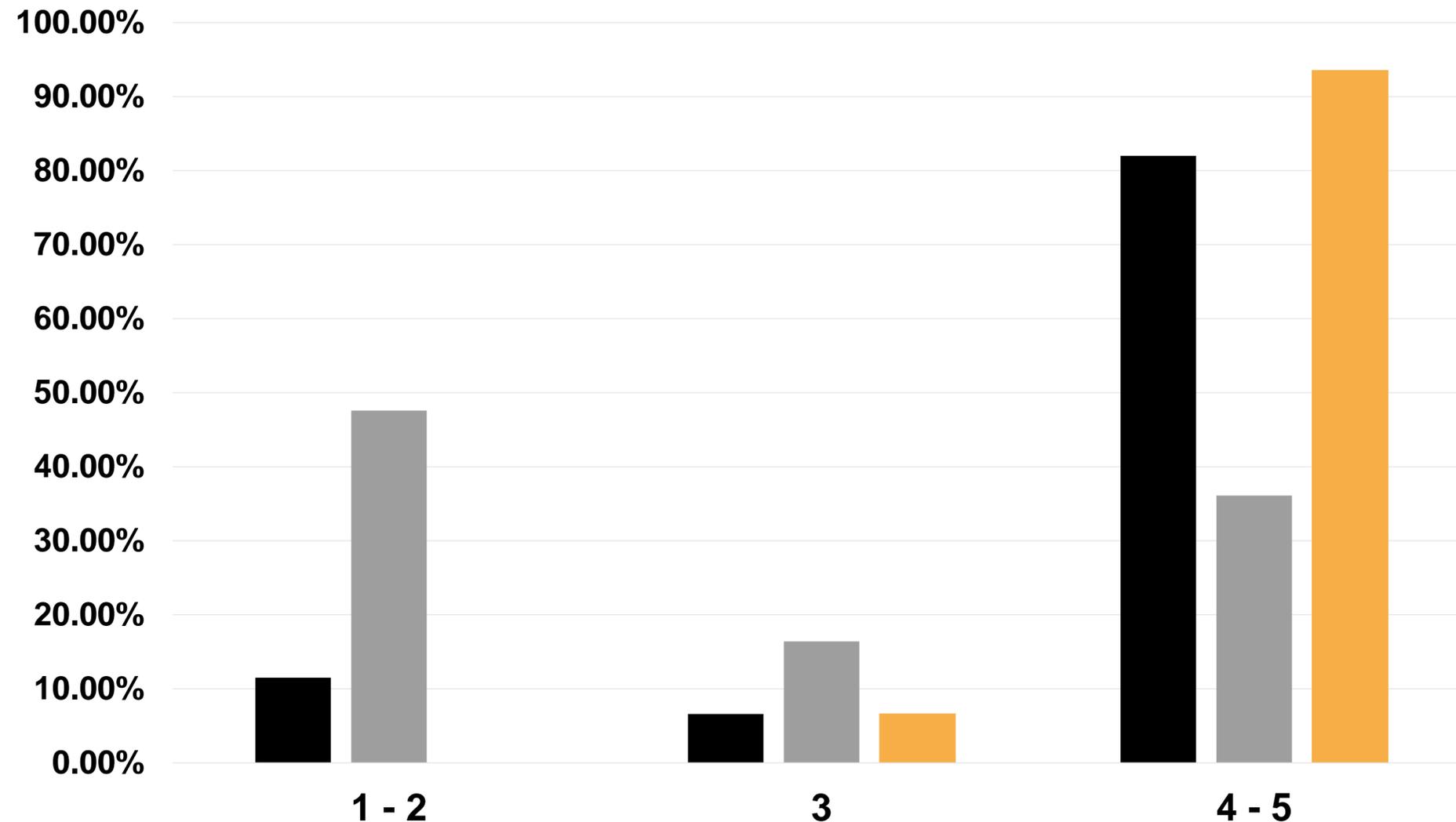


Search engines/Social Media return the same results to all users





Results: Awareness of Algorithmic Processes



■ Algorithms treat all users in the same way

■ My interaction with social media and search engine content, may influence the content that will be recommended to me in the future

■ Almost all applications that we use daily are driven by an algorithm

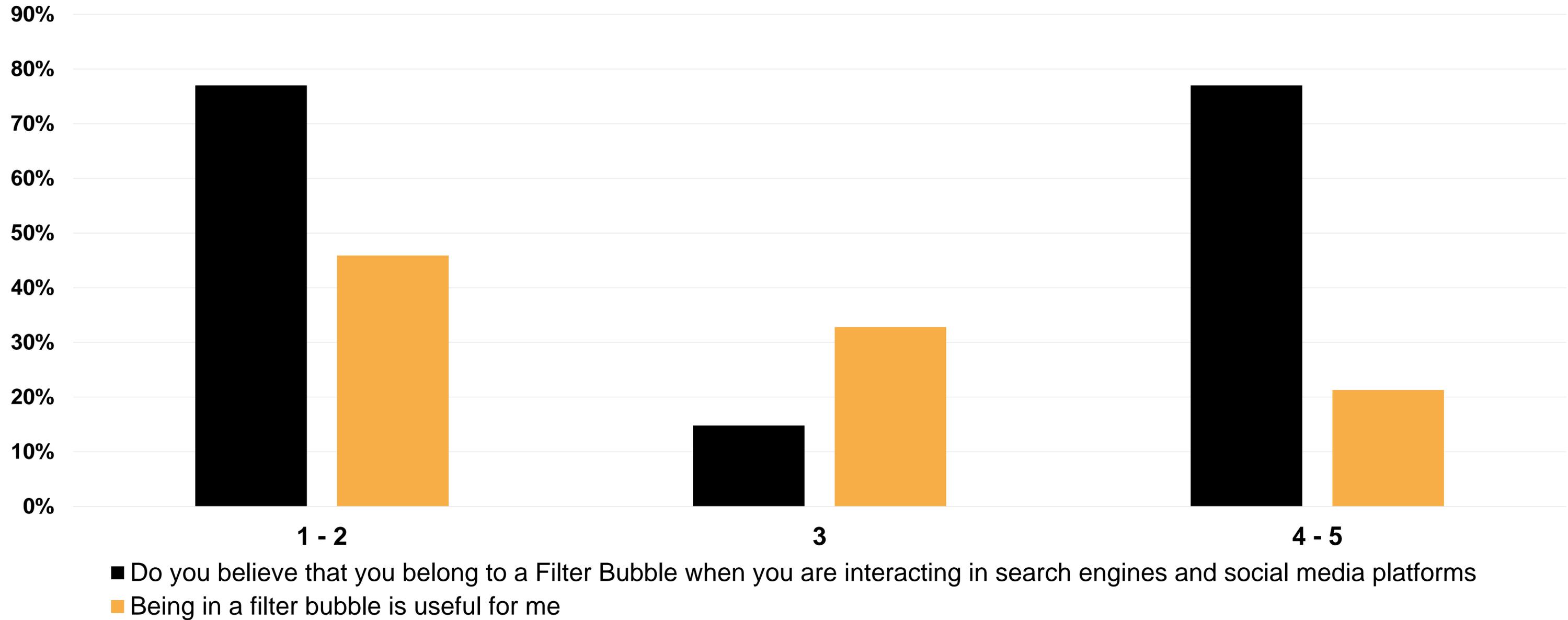
Algorithms treat all users in the same way

participants in the age group of 19 - 25 were marginally statistically significant more negative compared to other age groups

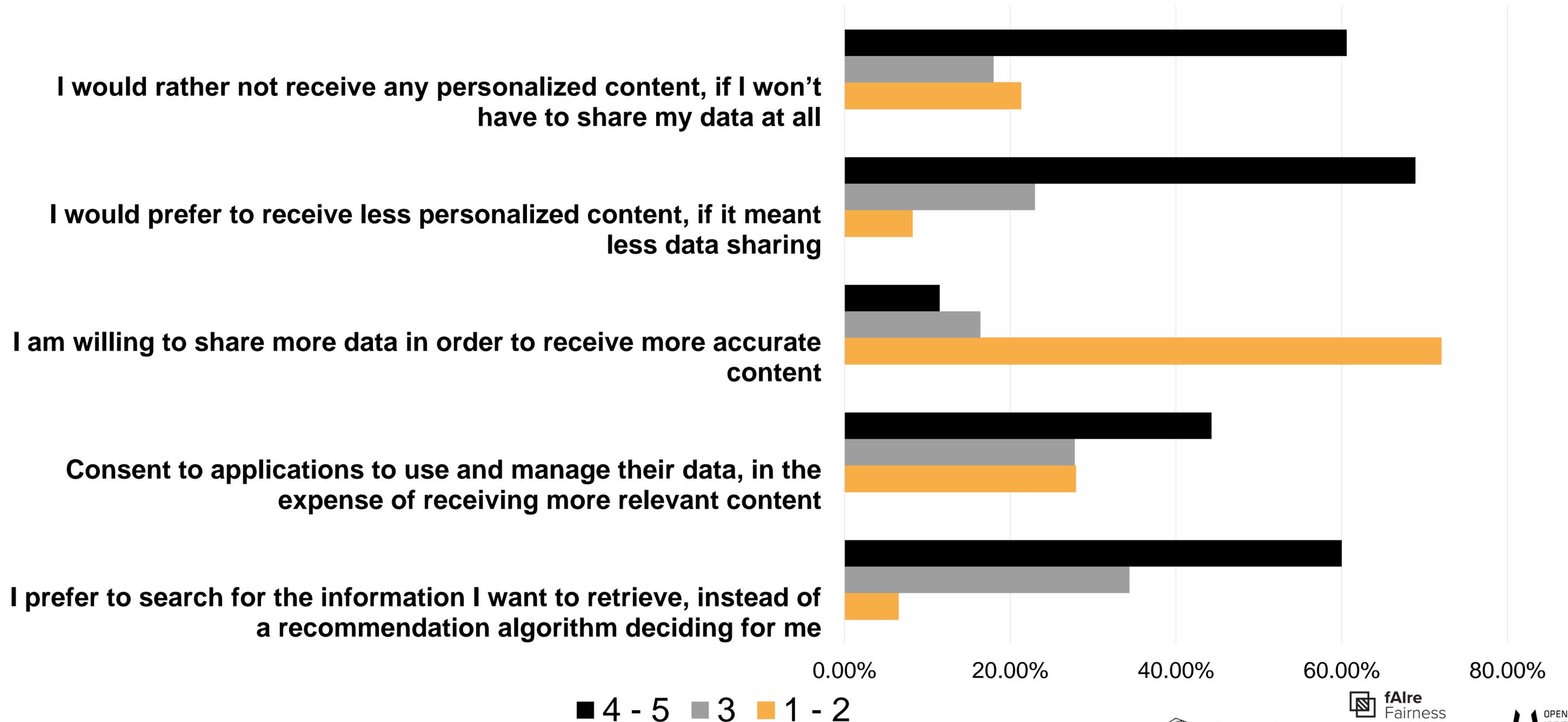
Kruskal – Wallis H test
 $H(5) = 11.169, p = 0.048$



Results: Attitude Towards the “Filter Bubble”

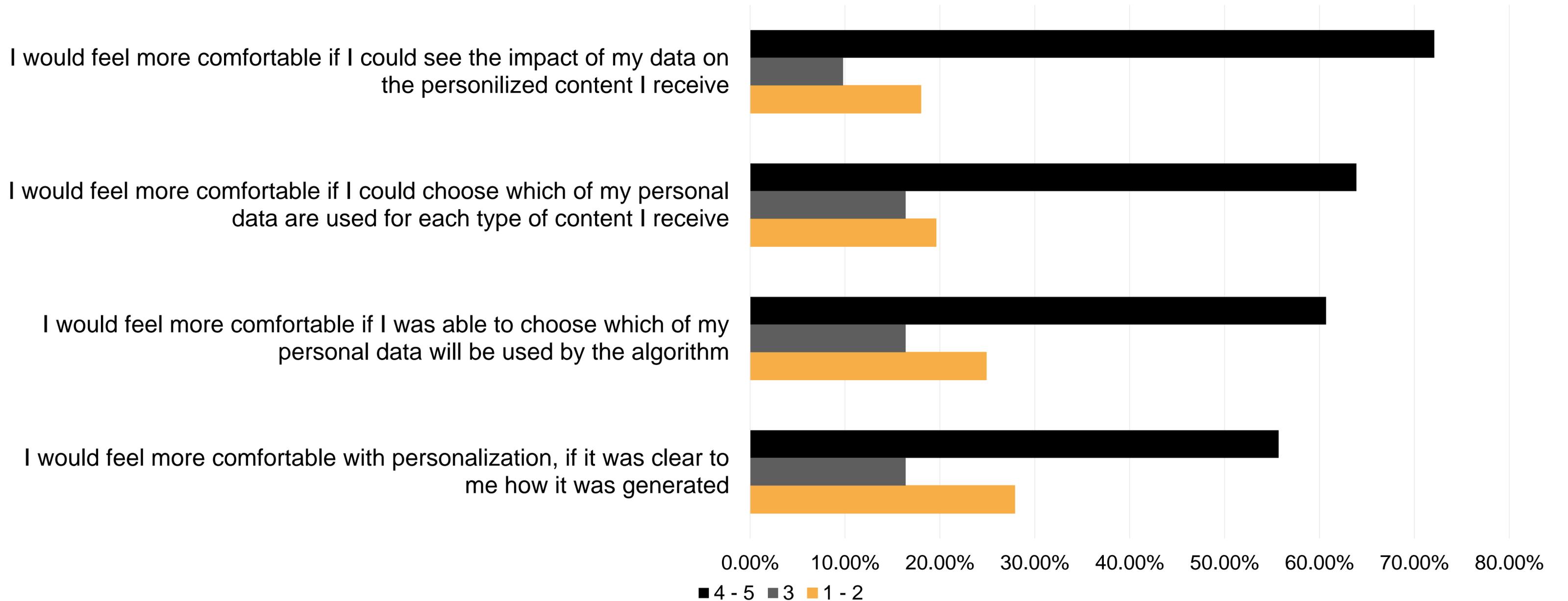


Results: Data Sharing for Personalization

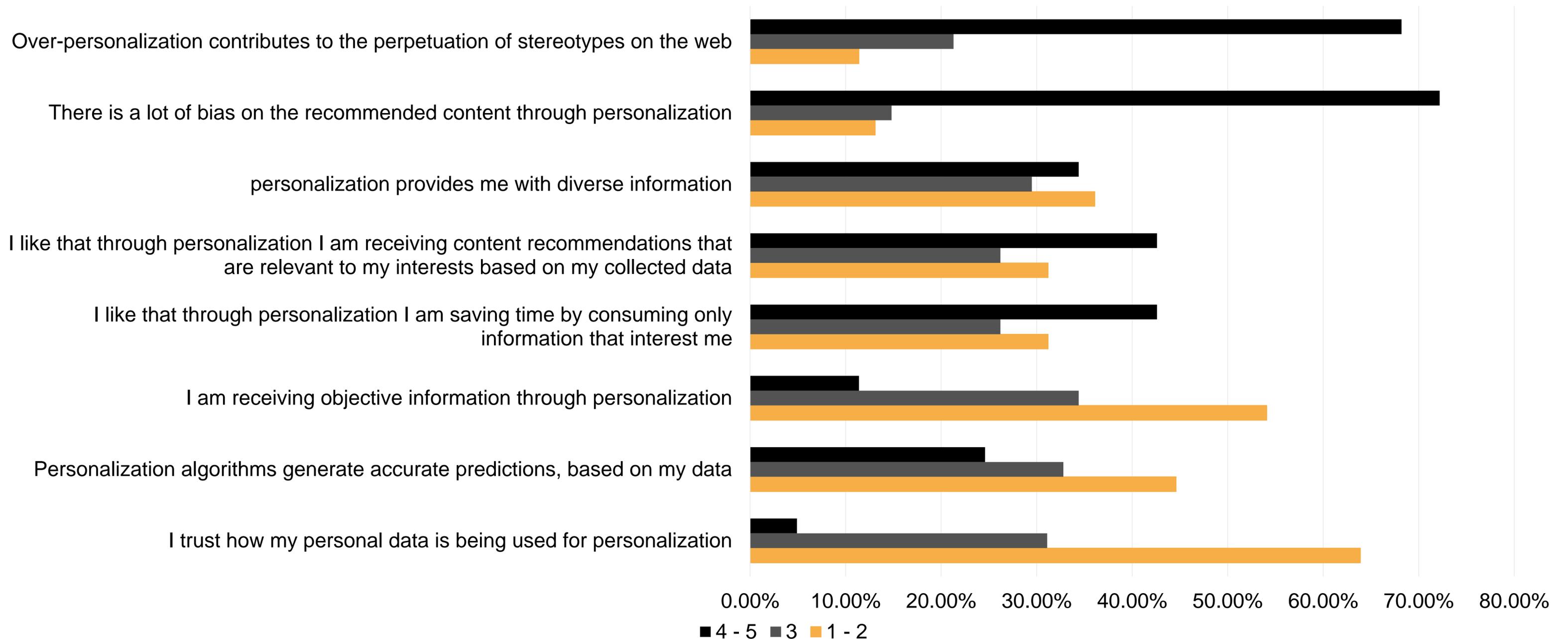




Results: Transparency of Personalization Services



Results: Attitude towards Personalization



Results: Data Sharing and Trust

H1: Participants who consent to applications to use and manage their data in the expense of receiving more accurate personalization, will also trust how their data are being used for providing personalization services.

Wilcoxon signed ranked test : $z = -4.920$, $p < 0.000$

Participants (27%) indicated that they consent to applications to use their data for personalization, while 39% stated that they do not trust how their data are being used.

H2: Participants who consent to applications to use and manage their data in the expense of receiving more relevant content, are also willing to share more data in order to receive more accurate information/content.

Wilcoxon signed ranked test: $z = -5.395$, $p < 0.000$

Participants indicating that although they consent to applications to use their data for providing personalization, they are not willing to share more data in the future.

Overall

- ❑ Enhancing the **user awareness** of algorithmic processes as well as the systems' transparency.
- ❑ Strong relationship between the willingness of the user to **share data** for personalization, and **trustworthiness** of the systems.
- ❑ **More transparency** and the need to **control** how their personal data would be used by the algorithms.
- ❑ Responses point to the need for **explanations** on how the collected data impacts the content they receive.
- ❑ Through personalization they save time, confirming the **important role of personalization** in information access systems today



Tools for user awareness

CYCLOPS is an example

Social Media search results for 'EU ban on one-use plastic'. The interface shows a search bar with the query and a user profile for 'Amelie' (17, France). Below the search bar, there are several social media posts. One post features an image of colorful plastic straws and a red prohibition sign over them. Another post shows a woman standing in a field of plastic waste. The interface includes a 'Search Engine' section with a search bar and a list of TV series and movies.

Administrator dashboard for CYCLOPS. The interface shows a sidebar with navigation options: Users, Workshops, Add Workshop, Workshops' List, Research Study, and User Guide. The main content area displays a table of Workshops. The table has columns for Number, Workshop Name, Workshop Description, Research Study, Status, and Actions. One workshop is listed: #1, Usability Study, Usability testing, Created 13-12-2022, and Active. There are buttons for Active, Edit, and Delete. A 'Search Engine Section' and 'Social Media Section' are also visible.

Workshop - Search Engine Section. The interface shows a search bar and a list of search results. The results are categorized into Filters (2), Profiles (6), Search Topics (2), Alternate Topics & Assumptions (0), Contents (25), Images (41), and Search Engine Research Data (106). The search results include 'Vacation destinations' and 'Tv series'.

Workshop - Social Media Section. The interface shows a search bar and a list of search results. The results are categorized into Subjects (2), Stages (3), Posts (10), Dummy Posts (4), Advert Posts (2), and Social Media Research Data (106). The search results include 'EU ban on one-use plastic' and 'POV Texts for Explanation Section'.



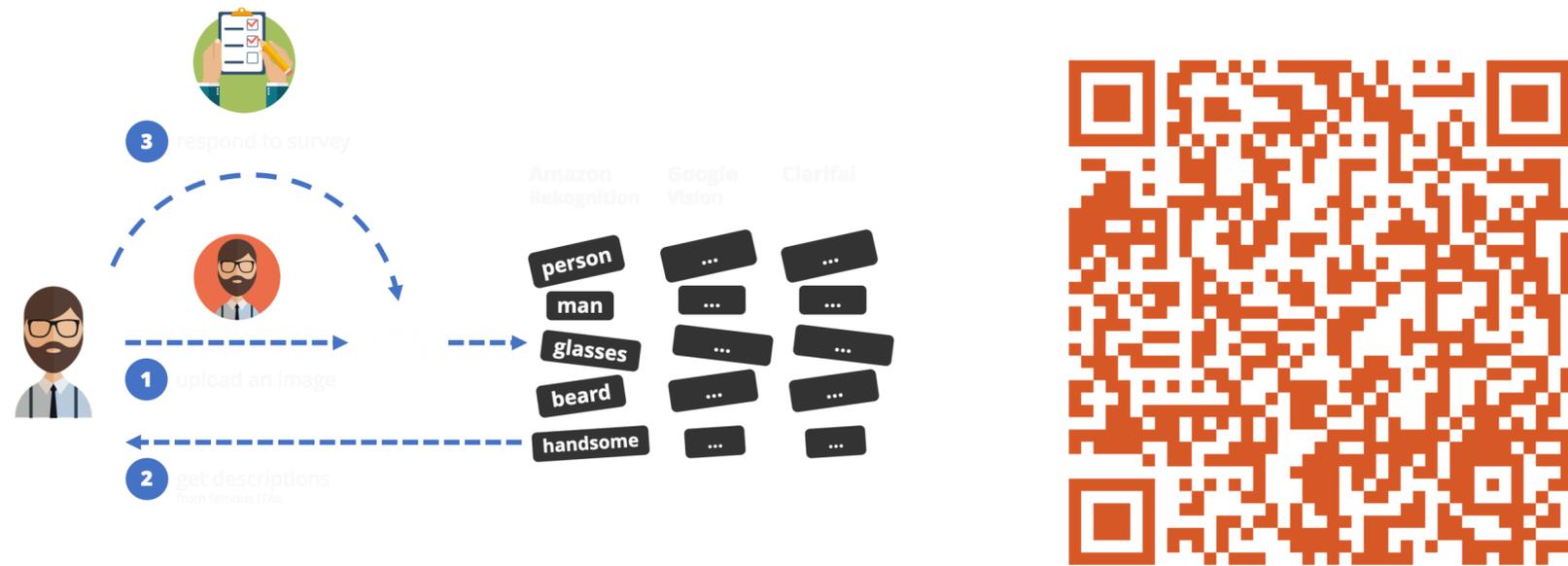
Anthi Ioannou, Nicolas Ioannou, and Styliani Kleanthous. 2023. Cyclops: Looking beyond the single perspective in information access systems. In Adjunct Proceedings of the 31st ACM Conference on User Modeling, Adaptation and Personalization (UMAP '23 Adjunct), June 26–29, 2023, Limassol, Cyprus. ACM, New York, NY, USA, 6 pages. <https://doi.org/10.1145/3563359.3597398>



Current and Future work



Understanding Human Perceptions of Image Tagging Algorithms

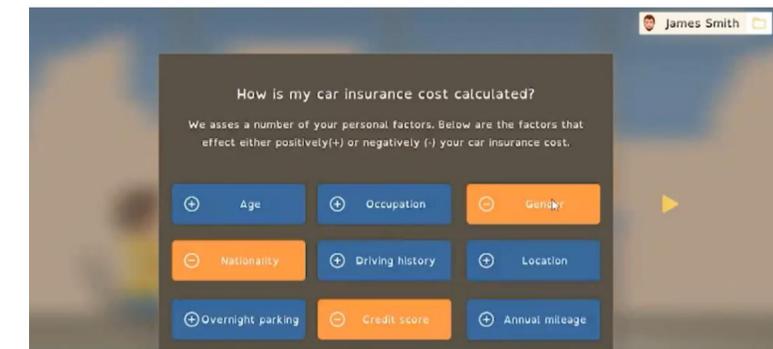


- a **research tool** for understanding people's perceptions on ITA outputs and
- as an **awareness tool** to help the general public in understanding the risks when using applications that are based on ITAs



- **Raise awareness** about explanations
- Help in **building trustworthy AI – Human Interaction**

Canvas City allows for different scenarios to be loaded and through the user interaction we can collect data and understand how do they perceive different system's decisions and explanations associated with them.



Thank you

More information: <https://faire.cyens.org.cy/>



fAlre
Fairness
and Ethics
in AI - Human
Interaction

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