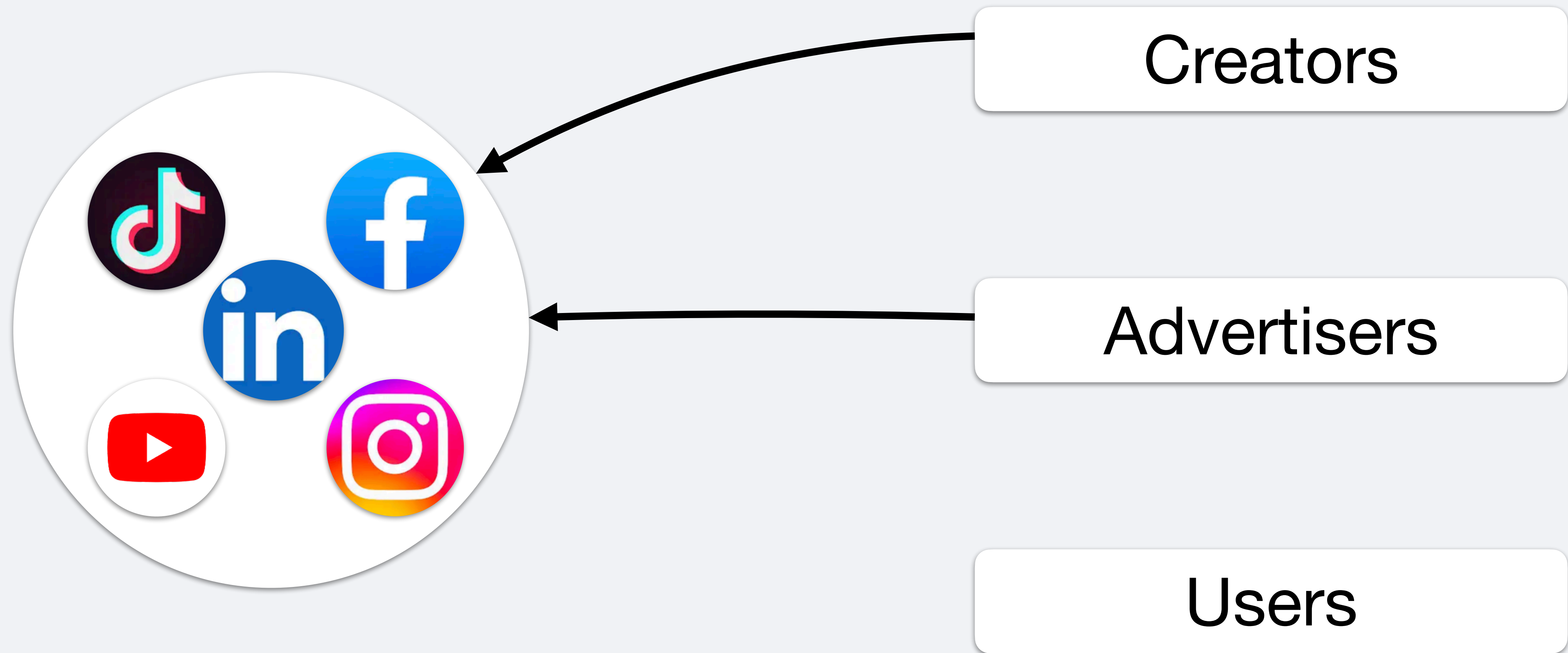


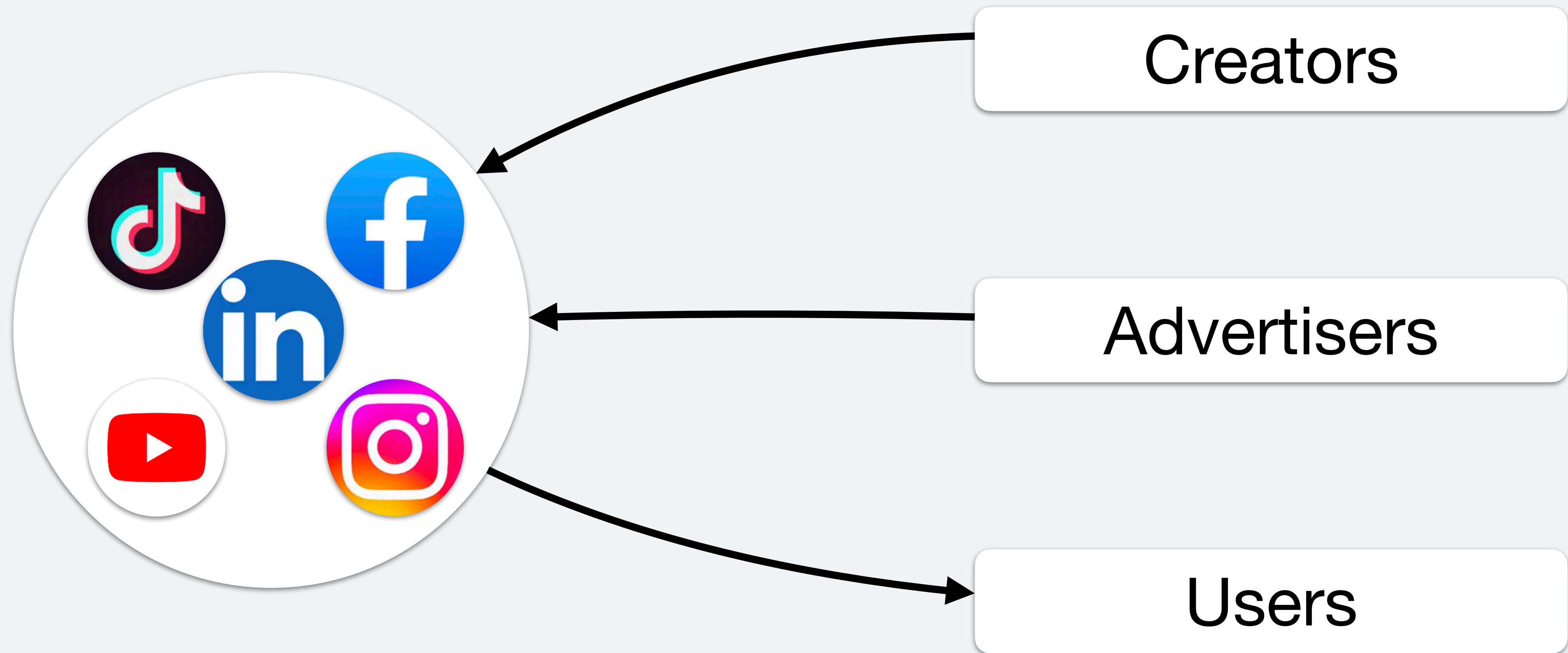
Individual and Societal Effects of Ad Delivery Algorithms

Piotr Sapiezynski
Northeastern University

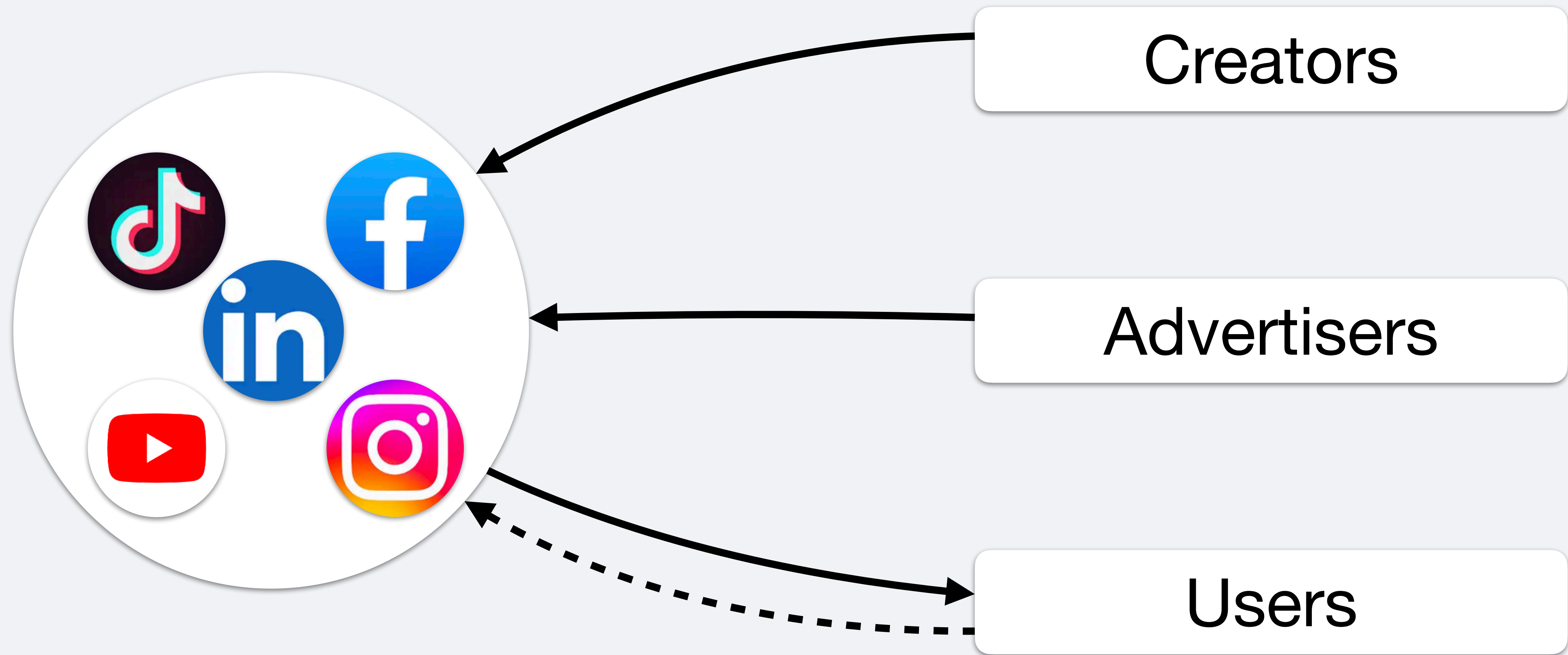
Based on joint work with Muhammad Ali, Levi Kaplan, Nicole Gerzon, Karolina Iwańska, Dorota Głowacka, Miranda Bogen, Aaron Rieke, Aleksandra Korolova, and Alan Mislove.



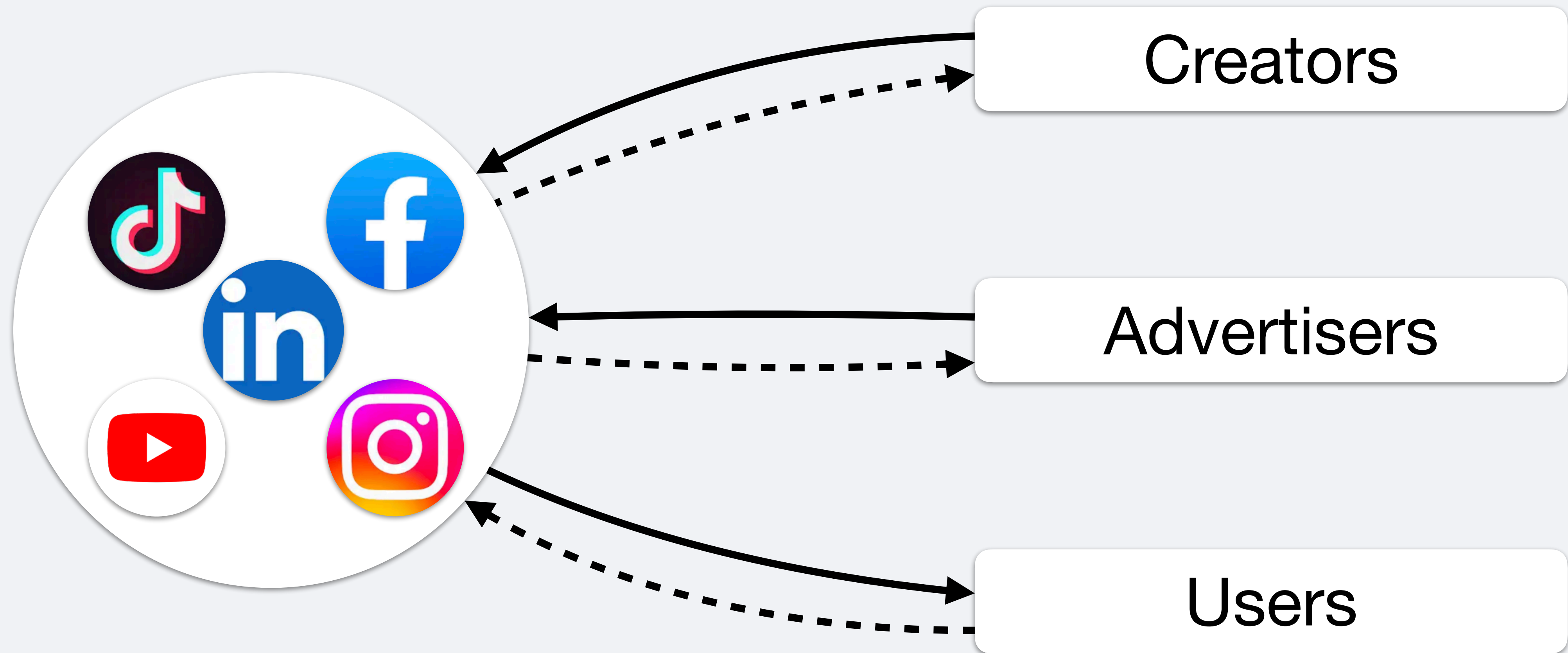
→ Content flow



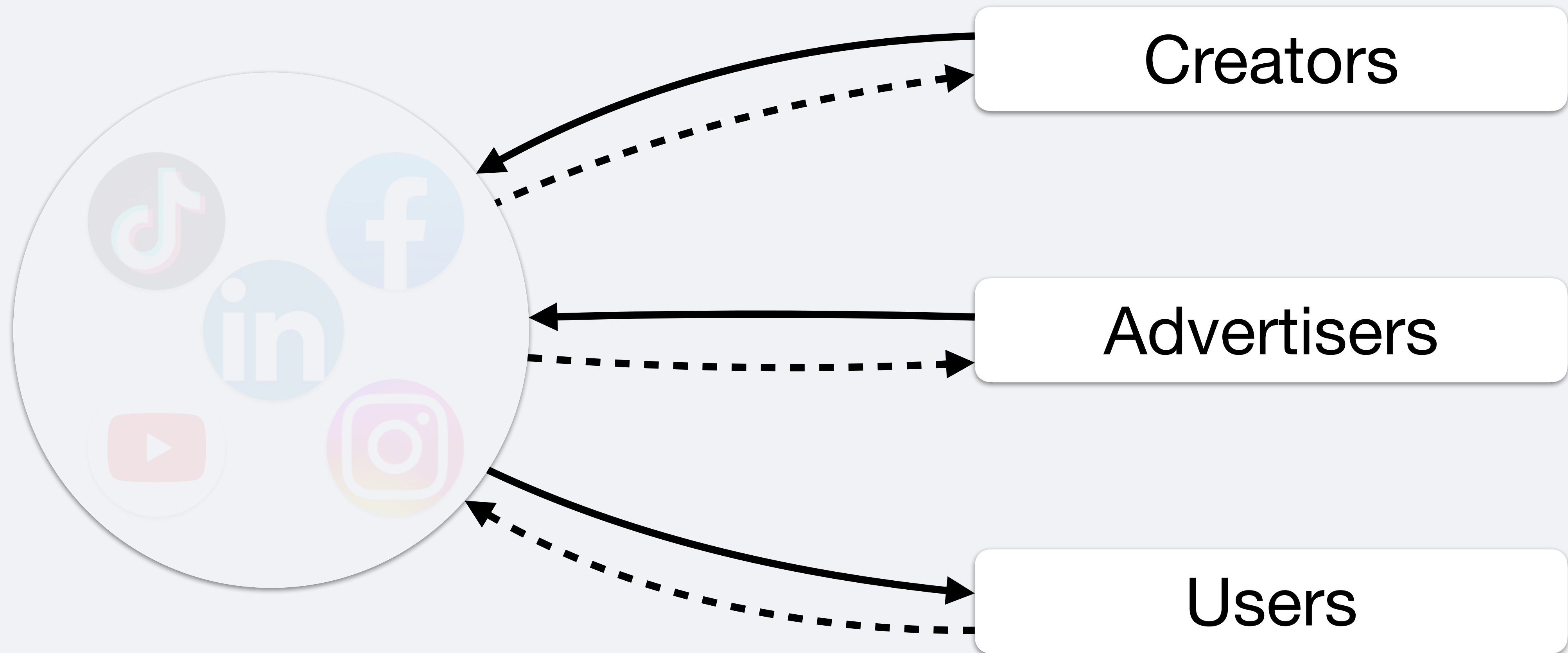
→ Content flow



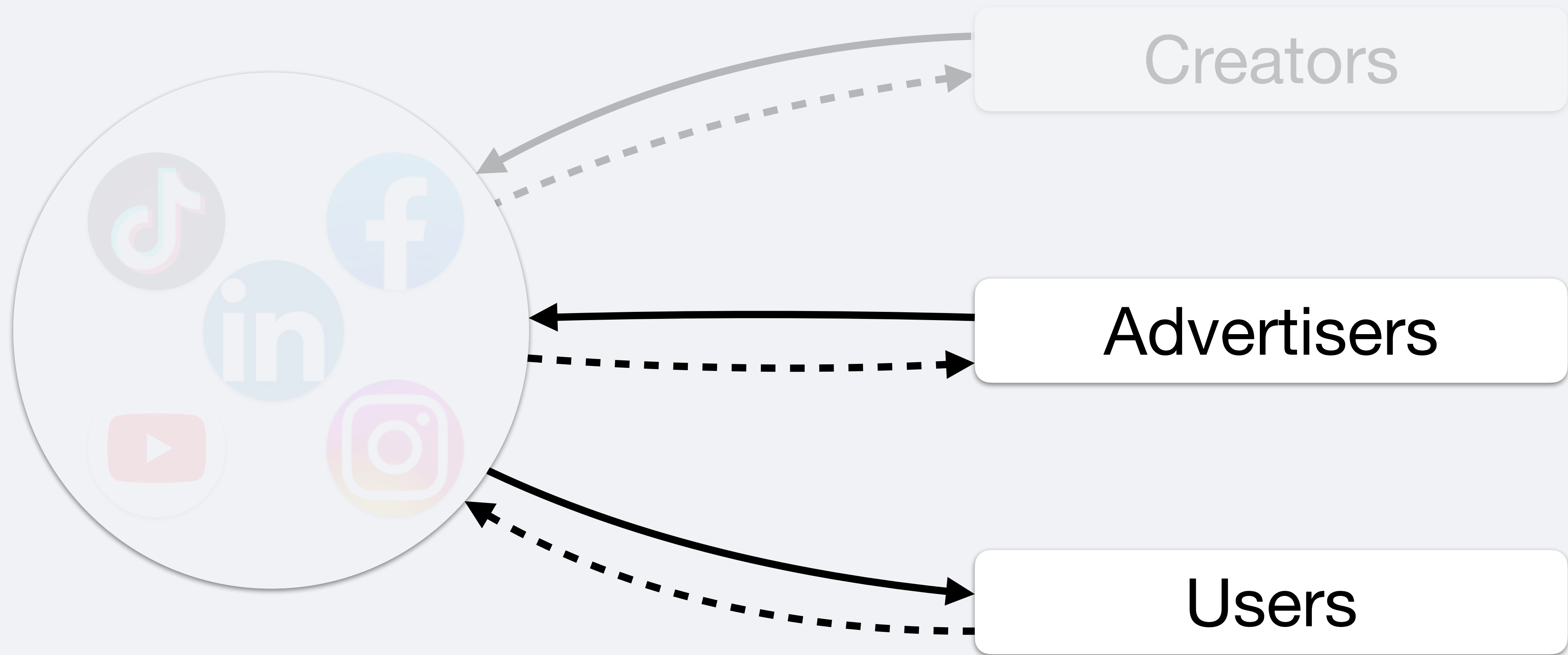
————→ Content flow
← - - - - Information flow



————→ Content flow
← - - - - Information flow



————→ Content flow
← - - - - Information flow





Google Search

I'm Feeling Lucky



🔍 Latanya Sweeney



Google Search

I'm Feeling Lucky



Latanya Sweeney



Ad • www.instantcheckmate.com

Latanya Sweeney, Arrested?

1) Enter Name and State 2) Access Full Background
Checks instantly

Ad • www.publicrecords.com

Latanya Sweeney

Public records for **Latanya Sweeney**. View now.



🔍 Latanya Sweeney



Ad • www.instantcheckmate.com

Latanya Sweeney, Arrested?

1) Enter Name and State 2) Access Full Background Checks instantly

Ad • www.publicrecords.com

Latanya Sweeney

Public records for **Latanya Sweeney**. View now.



🔍 Jill Schneider



Ad • www.instantcheckmate.com

Located: Jill Schneider

Information found on **Jill Schneider**. **Jill Schneider** found in database

Ad • www.intelius.com

We found Jill Schneider

Current Phone, Address, Age & More. Instant and Accurate **Jill Schneider**
Reverse Lookup - Reverse Cell Phone Directory - Property Records

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Dozens of Companies Are Using Facebook to Exclude Older Workers From Job Ads

Among the companies we found doing it: Amazon, Verizon, UPS and Facebook itself. “It’s blatantly unlawful,” said one employment law expert.

by Julia Angwin, ProPublica, Noam Scheiber, The New York Times, and Ariana Tobin, ProPublica, Dec. 20, 2017, 5:45 p.m. EST

Facebook Lets Advertisers Exclude Users by Race

Facebook’s system allows advertisers to exclude black, Hispanic, and other “ethnic affinities” from seeing ads.

by Julia Angwin and Terry Parris Jr., Oct. 28, 2016, 1 p.m. EDT



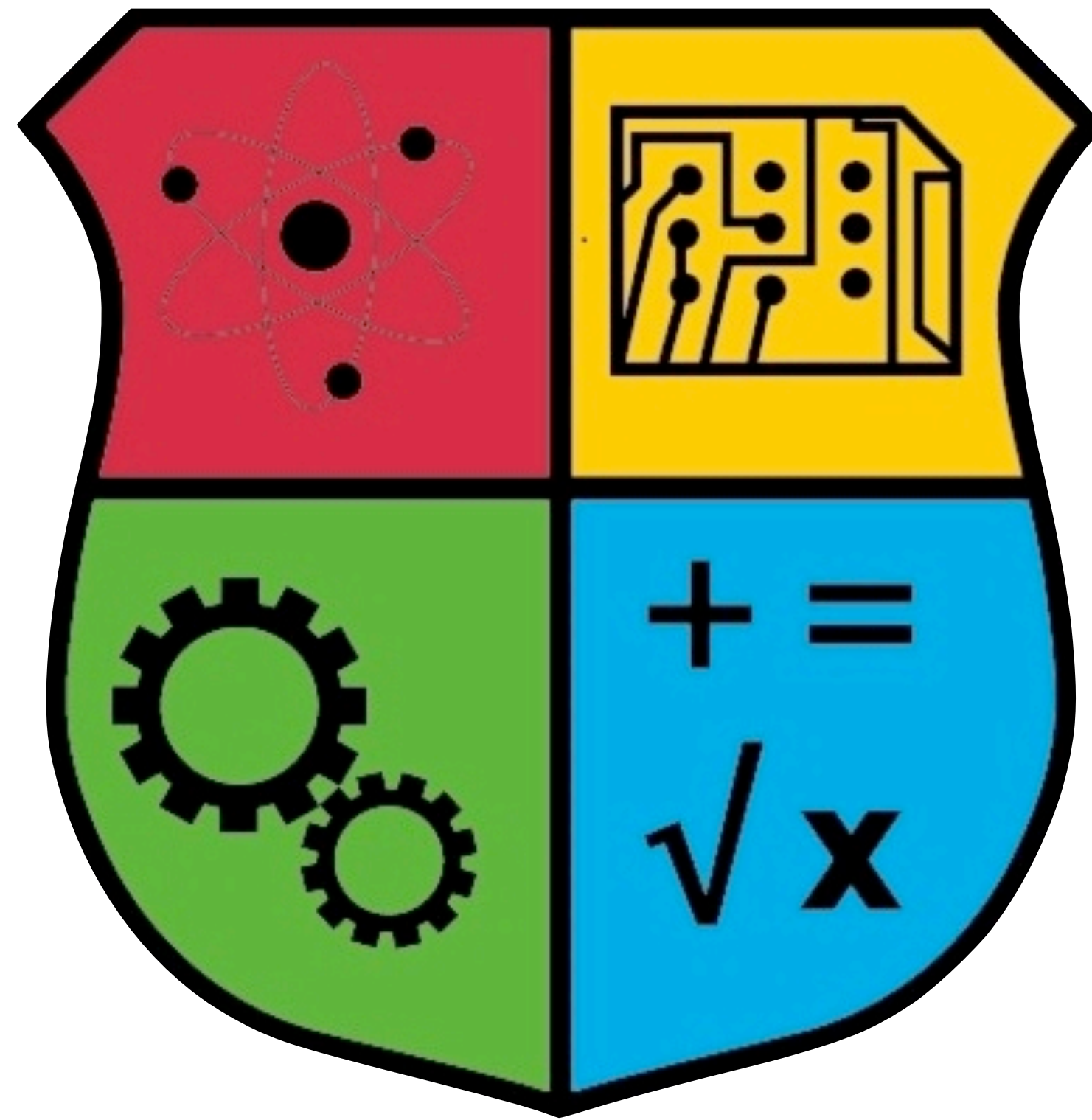
two phases of online advertising

phase 1: targeting

- controlled by the advertiser
- who is the **target audience**

phase 2: ad delivery

- controlled by the platform
- who is the **actual audience**



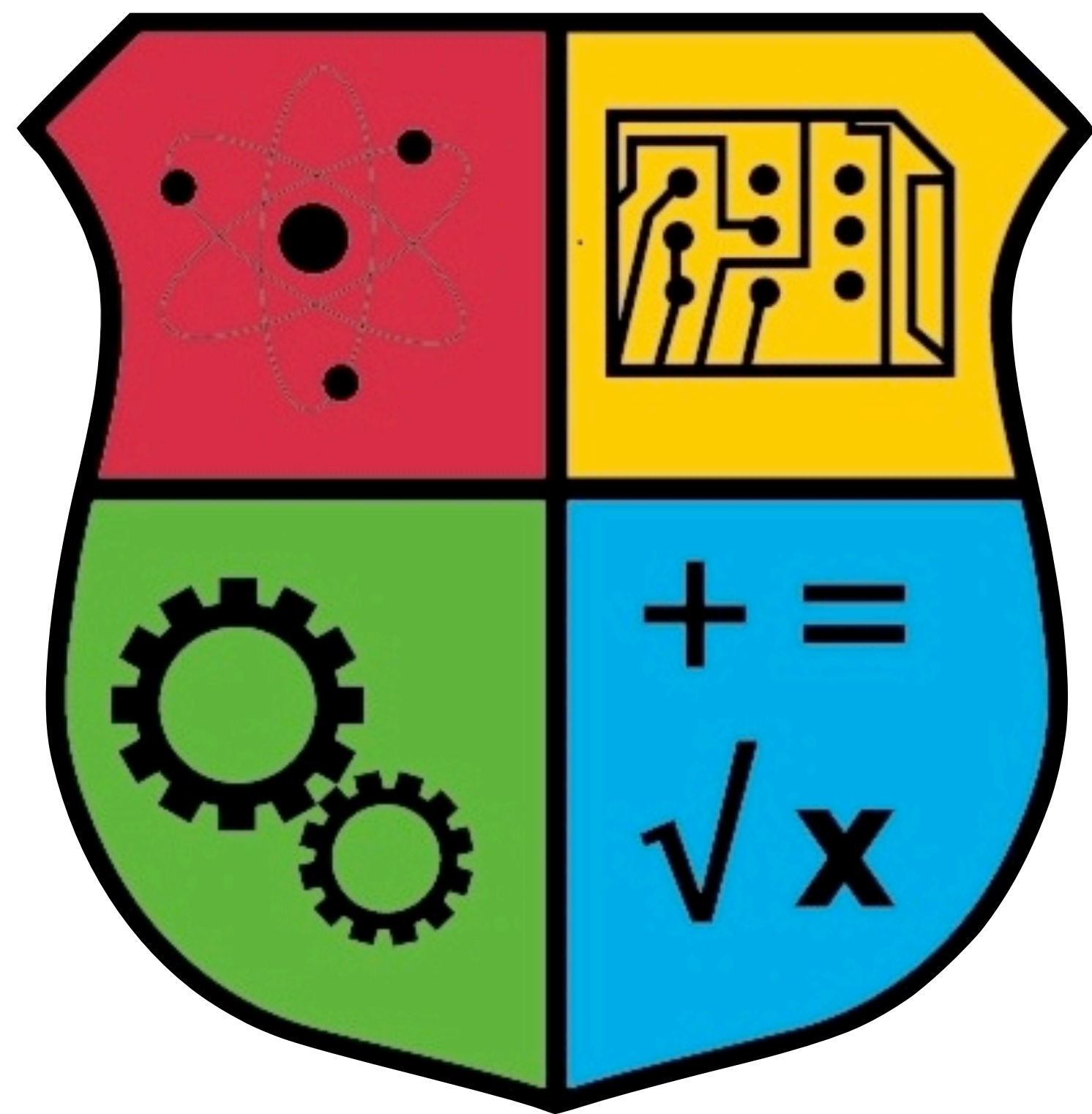
STEM Careers
Information about STEM Careers

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Anja Lambrecht, Catherine Tucker, *Algorithmic Bias? An Empirical Study of Apparent Gender-Based Discrimination in the Display of STEM Career Ads*, (2019)



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Information about STEM Careers



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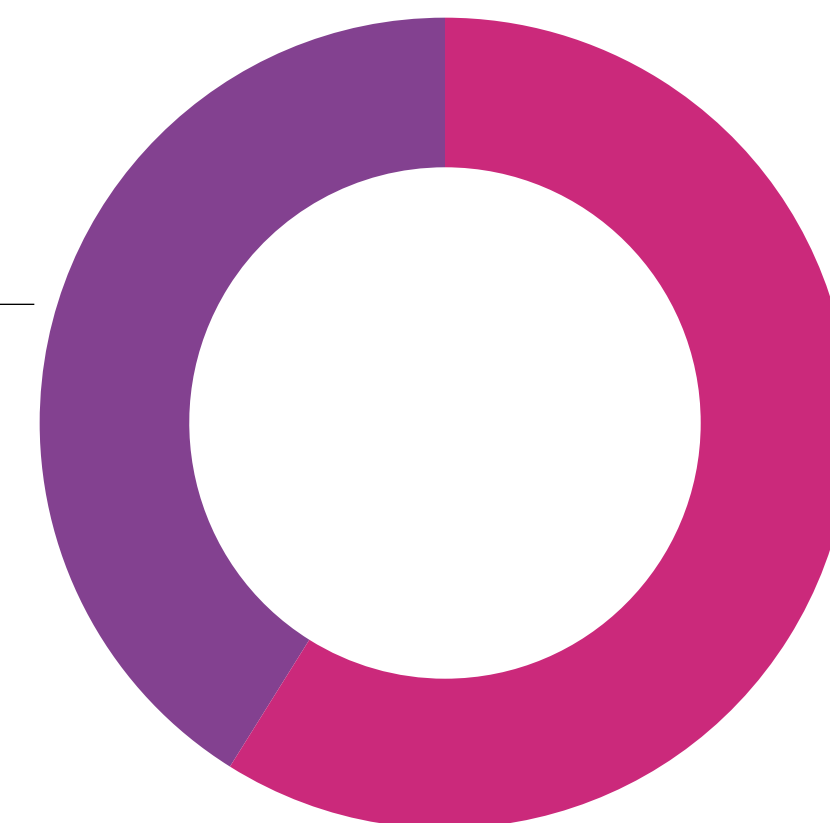


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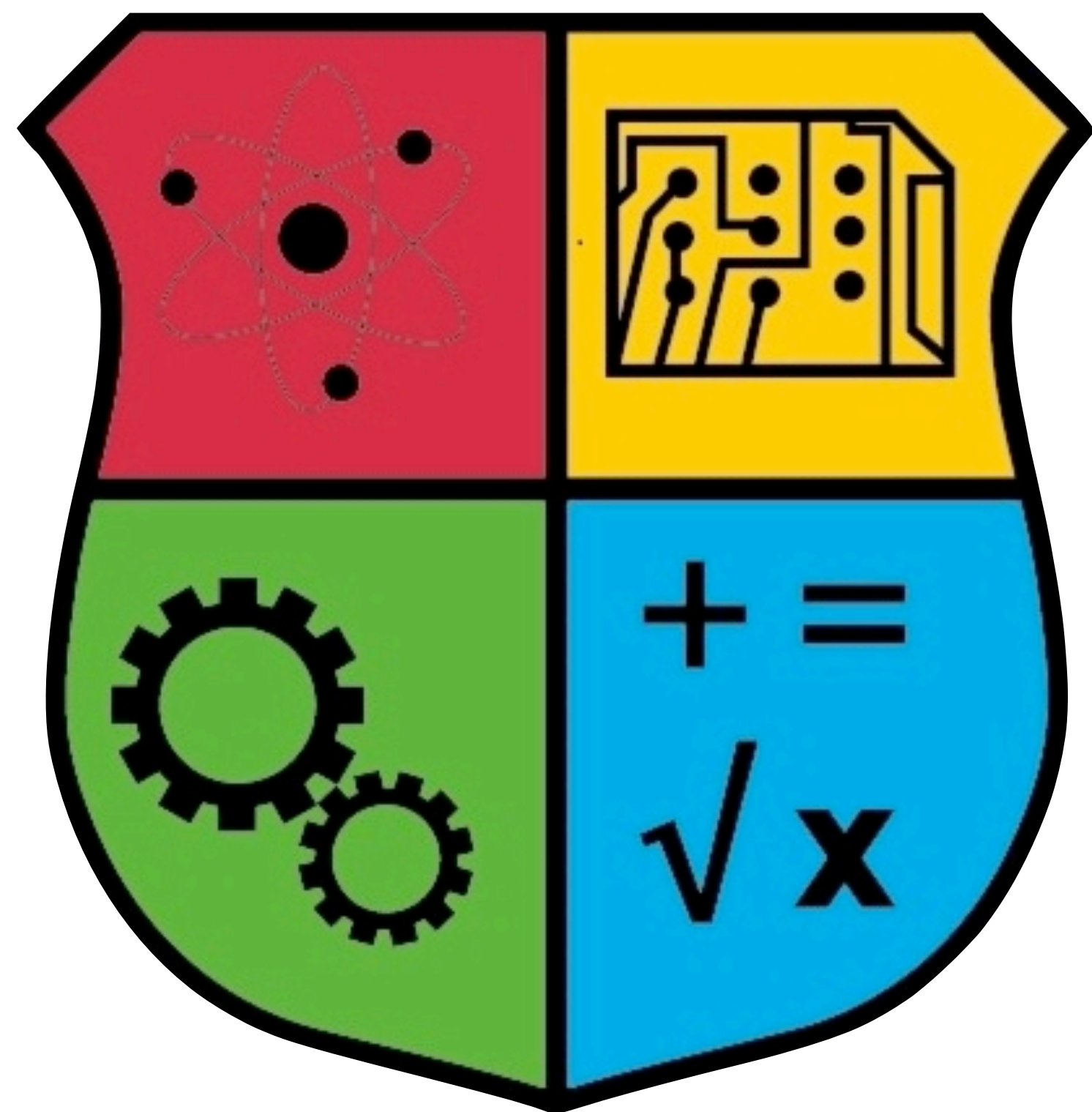
Men
41%



Women
59%

US Facebook users

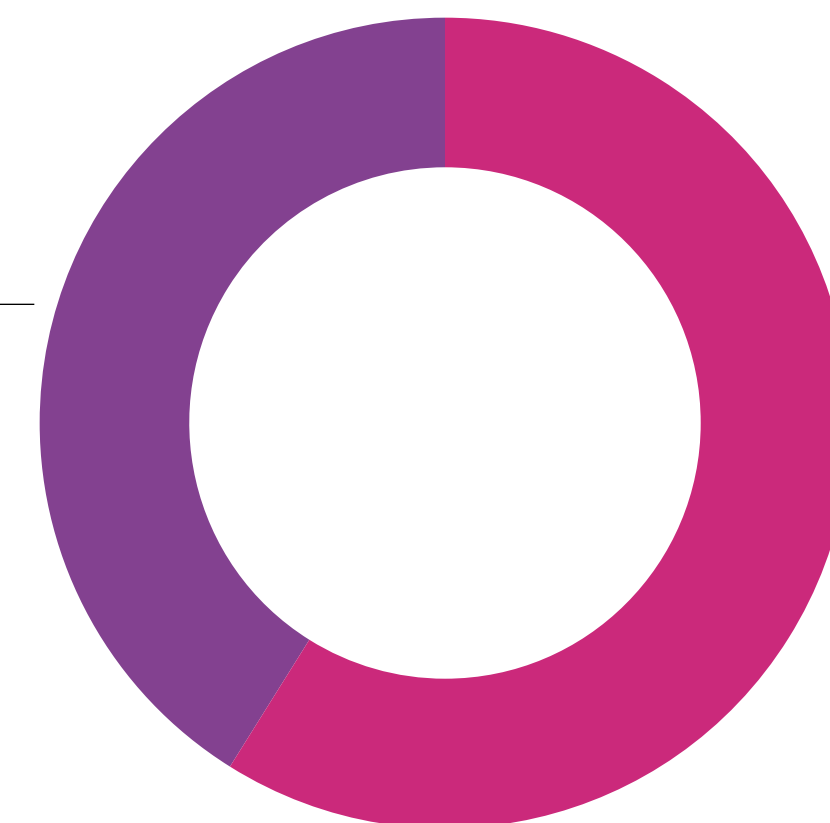
Anja Lambrecht, Catherine Tucker, *Algorithmic Bias? An Empirical Study of Apparent Gender-Based Discrimination in the Display of STEM Career Ads*, (2019)



STEM Careers
Information about STEM Careers



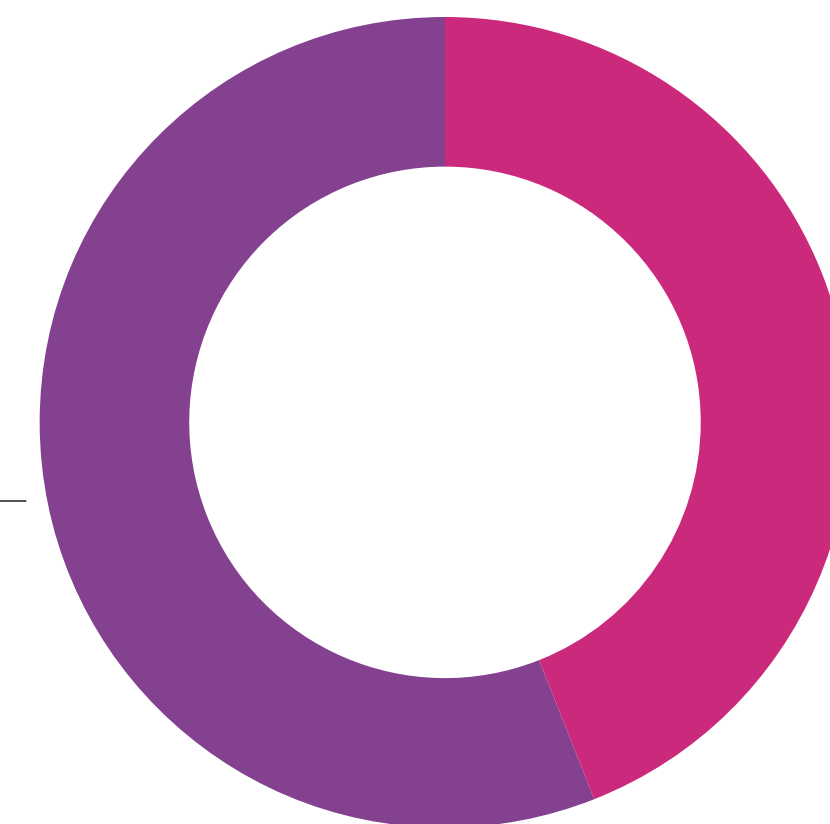
Men
41%



Women
59%

US Facebook users

Men
56%



Women
44%

Users who were shown the ad

Anja Lambrecht, Catherine Tucker, *Algorithmic Bias? An Empirical Study of Apparent Gender-Based Discrimination in the Display of STEM Career Ads*, (2019)

Begin your career as a sanitation worker, a janitorial cleaner, or a housekeeper.



INDEED.COM

Find a job in cleaning

26,175 Janitor jobs available on indeed.com.



Like



Comment



Share

Begin your career working at a lumber yard, sawmill, construction, or even in the forest.



INDEED.COM

Find a job in lumber industry

10,417 Lumber jobs available on indeed.com.



Like



Comment



Share

Begin your career as a sanitation worker, a janitorial cleaner, or a housekeeper.



INDEED.COM

Find a job in cleaning

26,175 Janitor jobs available on indeed.com.



Like



Comment

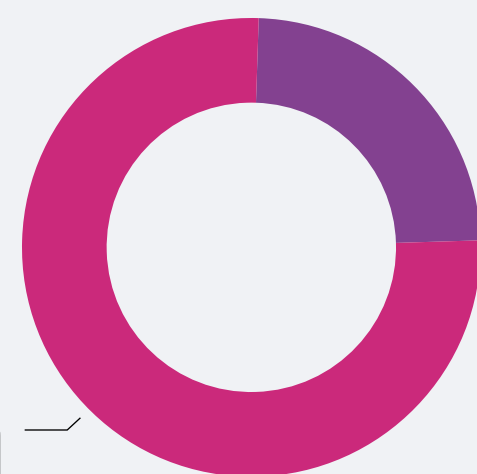


Share



63% Black

76% women



Begin your career working at a lumber yard, sawmill, construction, or even in the forest.



INDEED.COM

Find a job in lumber industry

10,417 Lumber jobs available on indeed.com.



Like



Comment

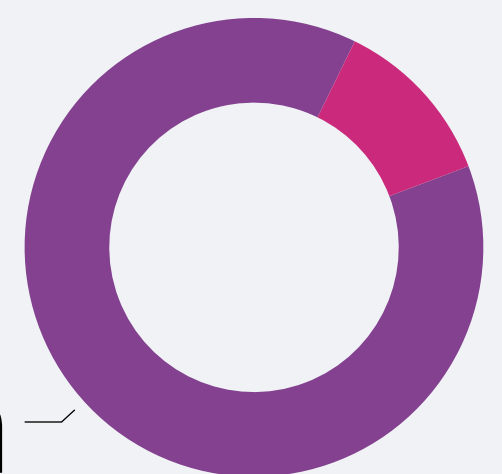


Share



75% white

88% men



Become a driver at Domino's and deliver pizza.



JOBS.DOMINOS.COM

**Domino's is now hiring
pizza delivery drivers.**

LEARN MORE



Like



Comment



Share

Become a driver at Instacart and deliver groceries.



SHOPPERS.INSTACART.COM

**Instacart is now hiring
grocery delivery drivers.**

LEARN MORE



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Become a driver at Domino's and deliver pizza.



JOBS.DOMINOS.COM

**Domino's is now hiring
pizza delivery drivers.**

LEARN MORE



Like



Comment



Share

women
48%



men
52%

Become a driver at Instacart and deliver groceries.



SHOPPERS.INSTACART.COM

**Instacart is now hiring
grocery delivery drivers.**

LEARN MORE



Like



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Share

women
70%



men
30%

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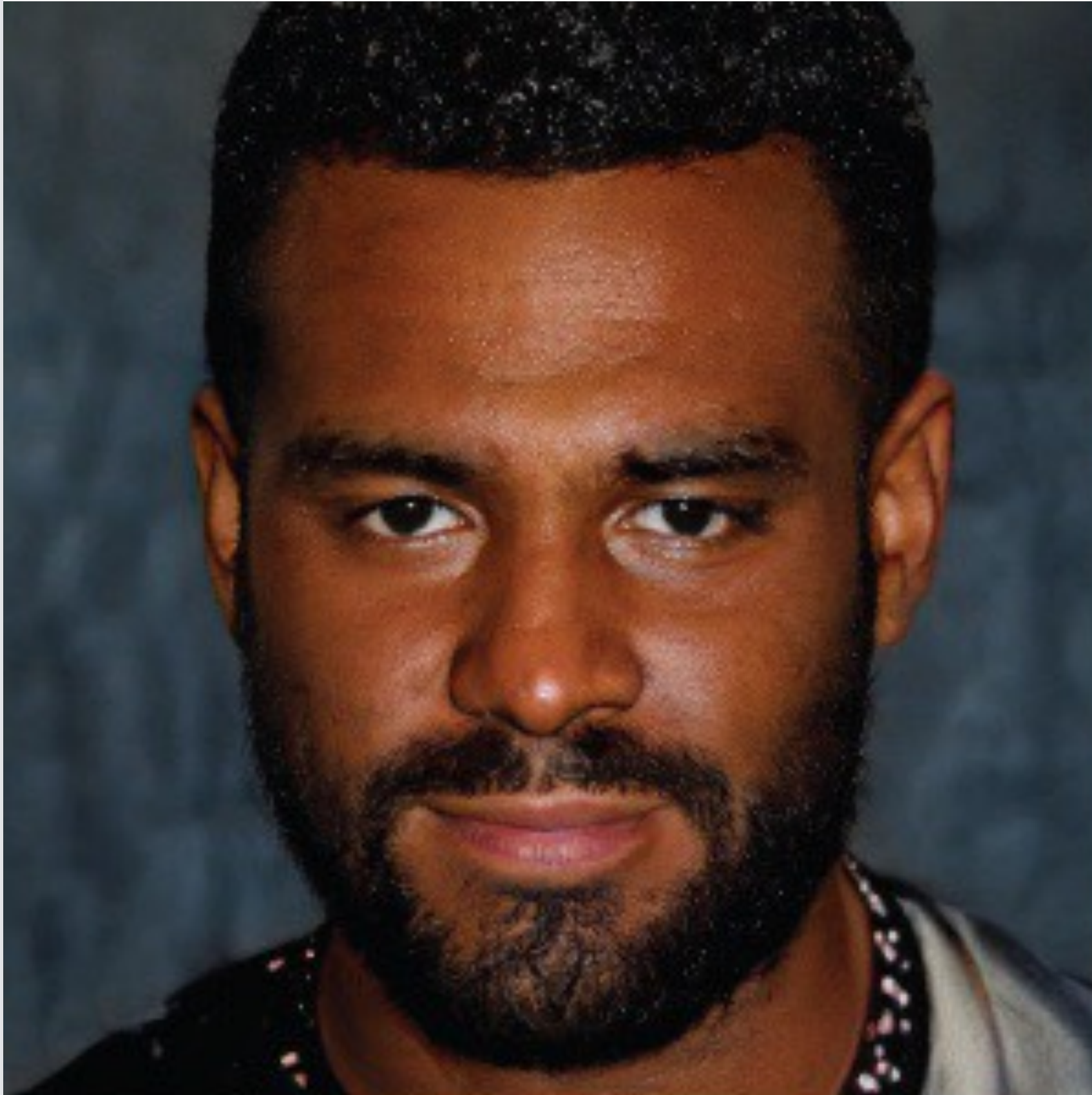
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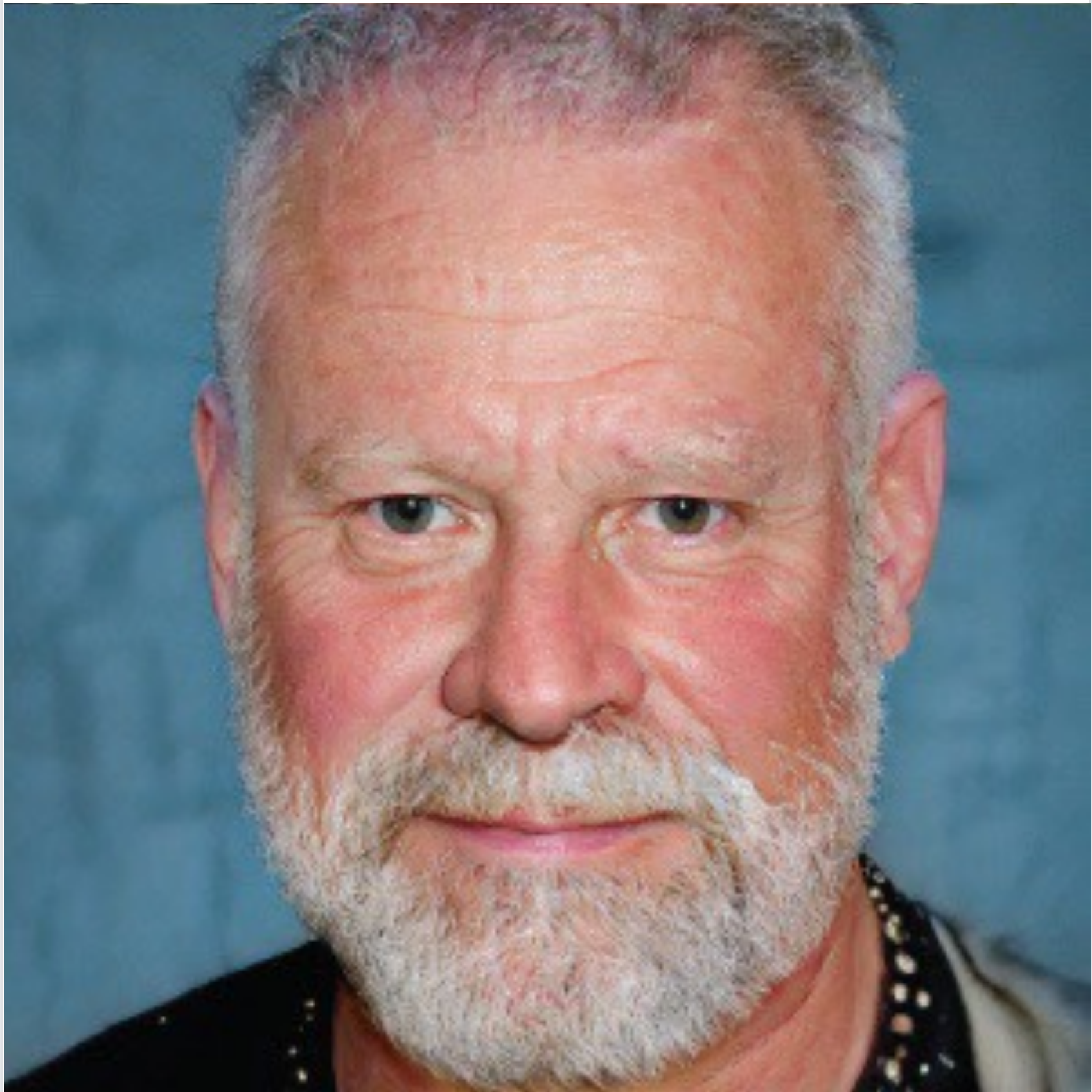
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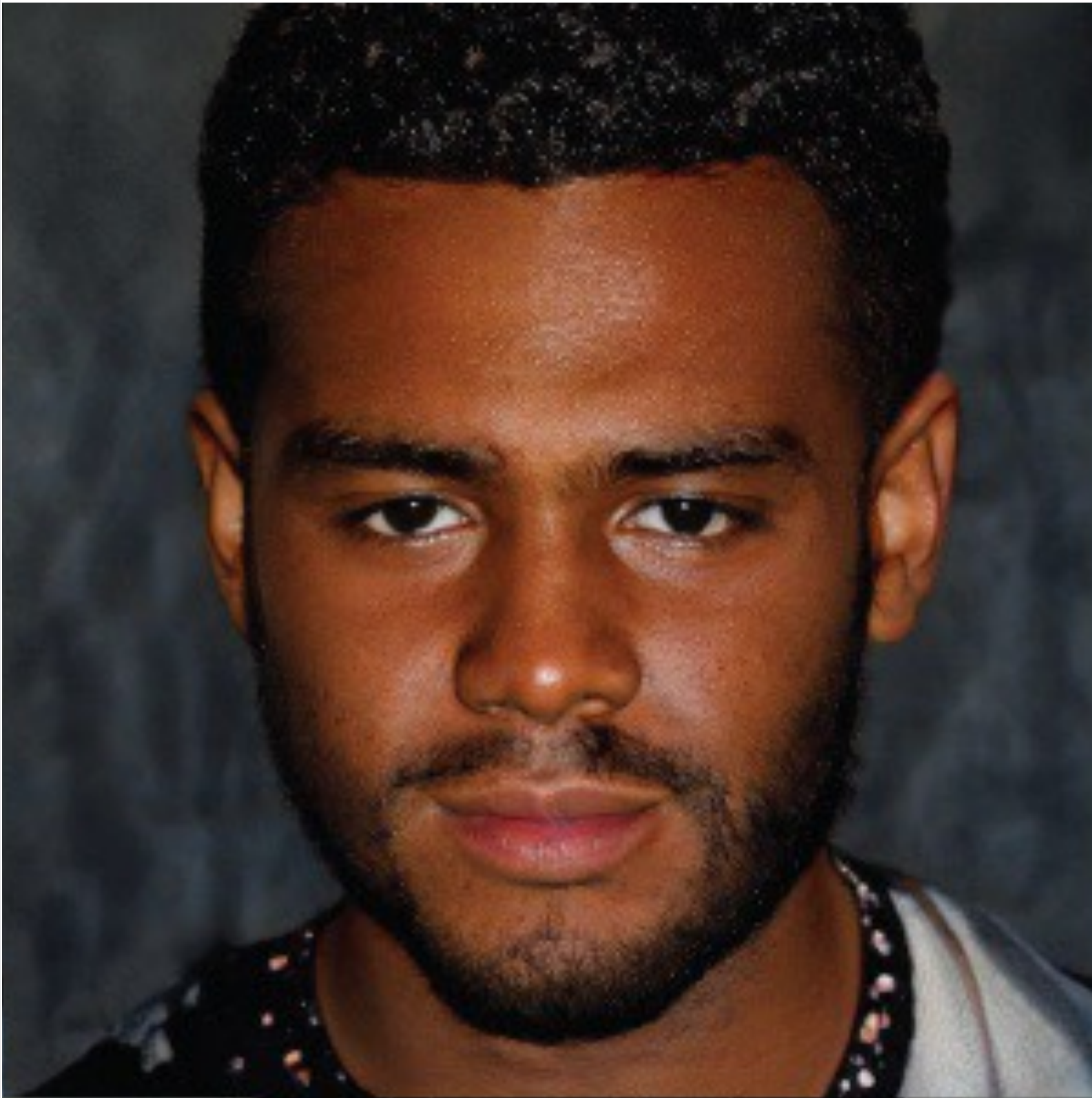
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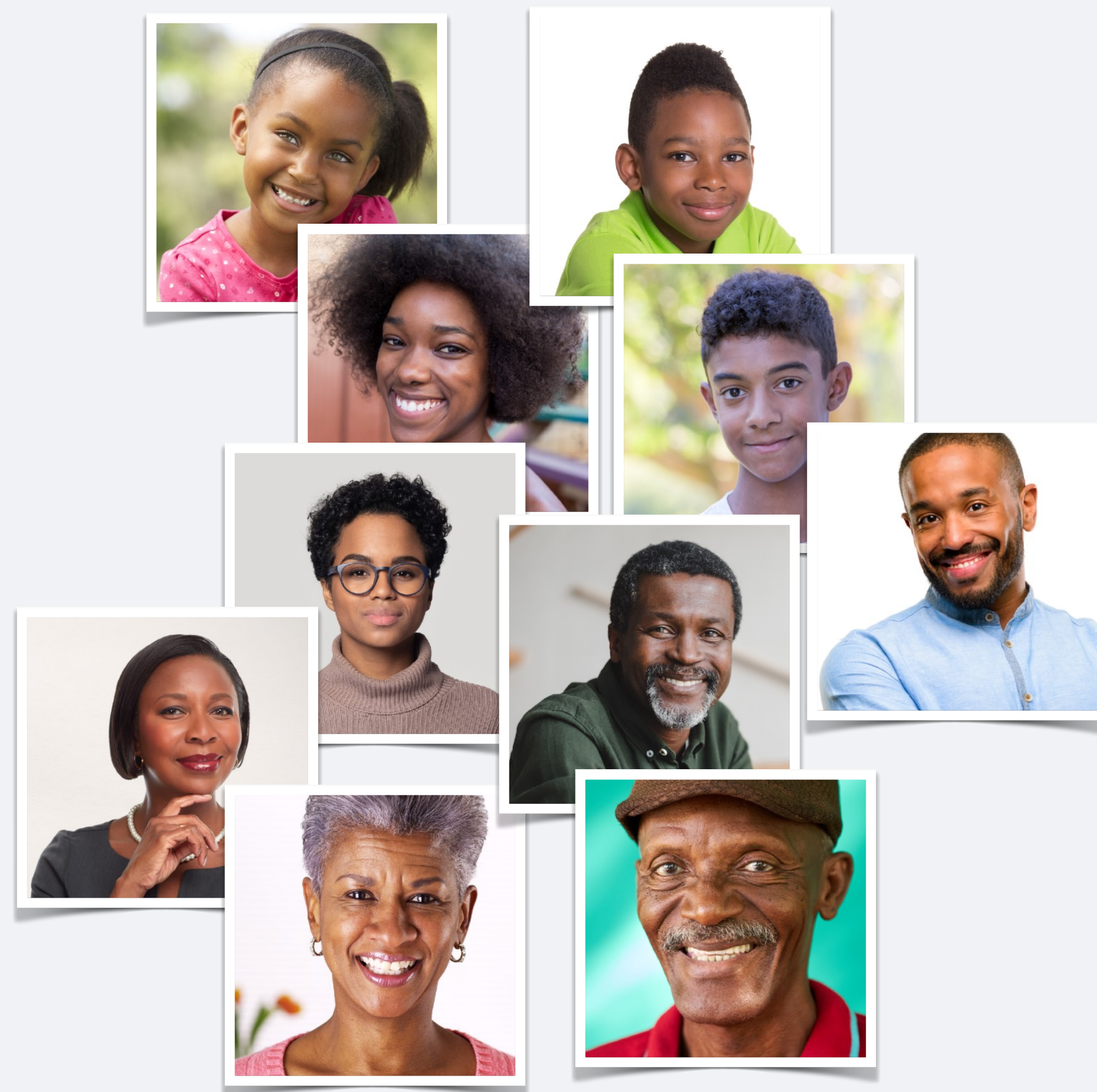
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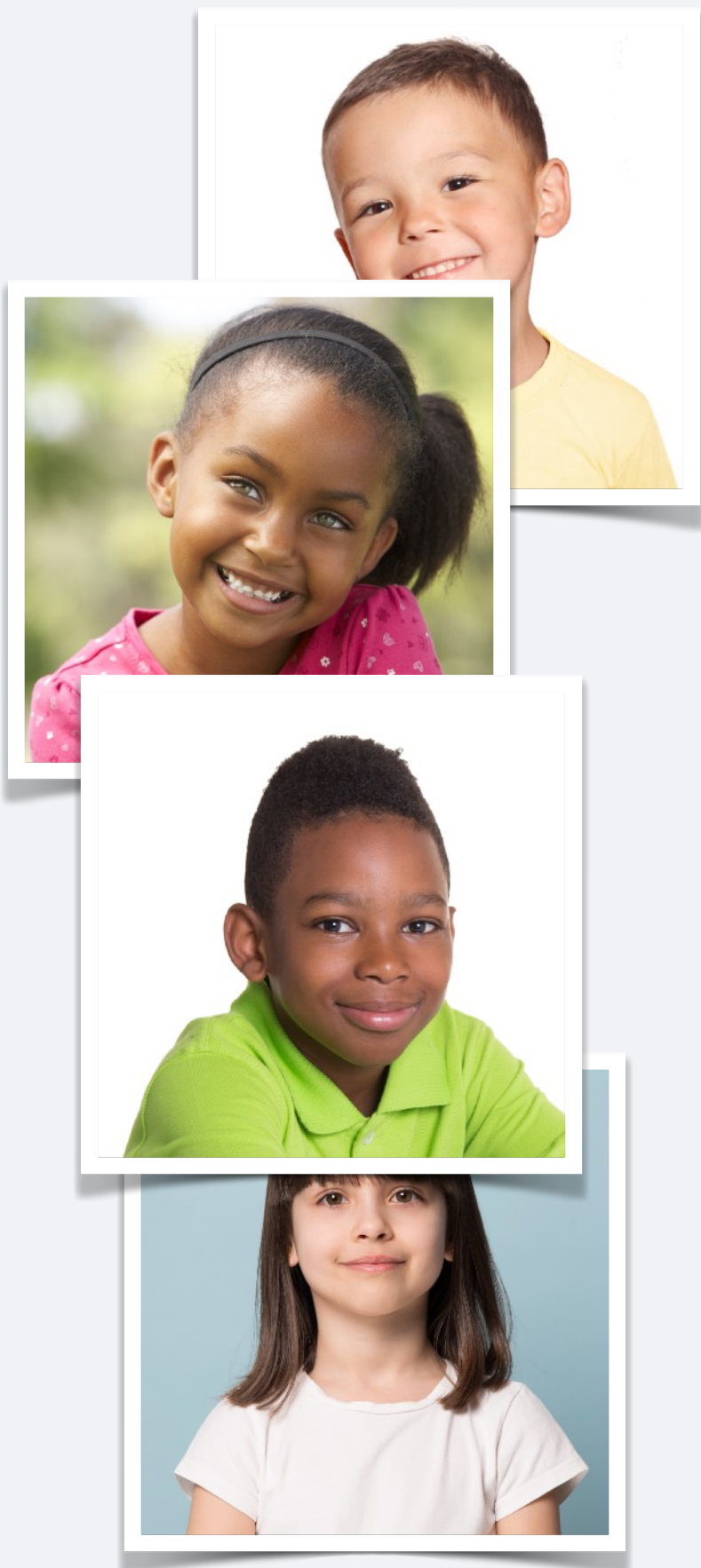
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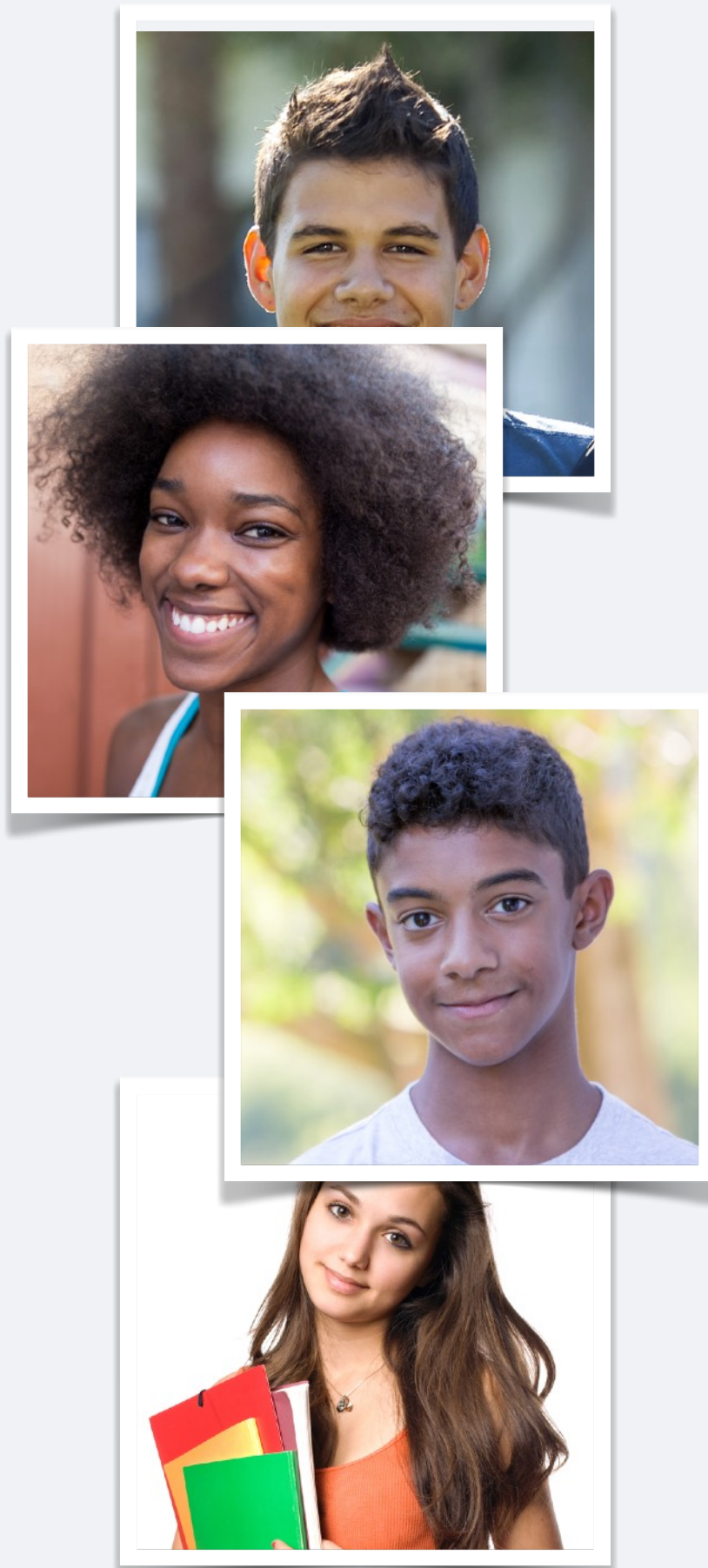
56%
Black



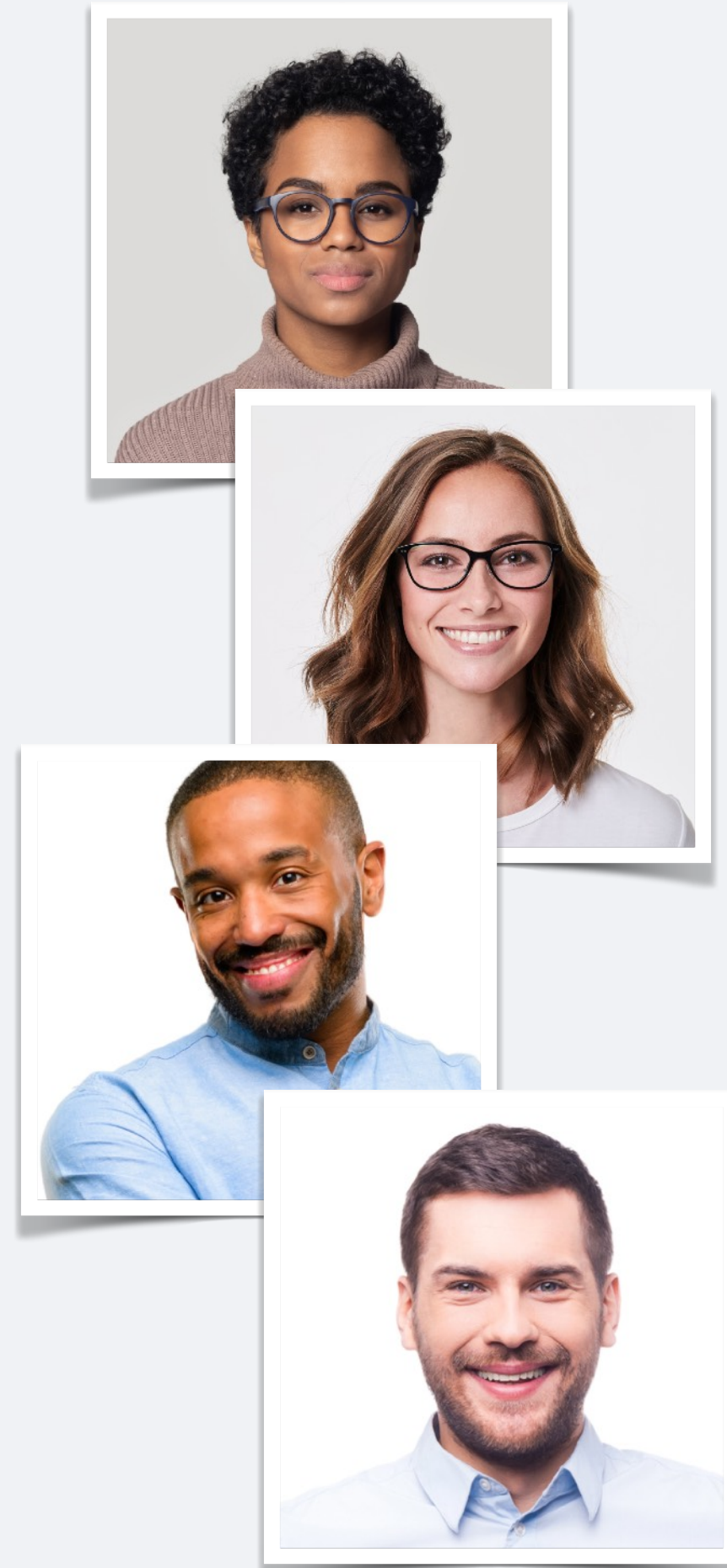
74%
Black



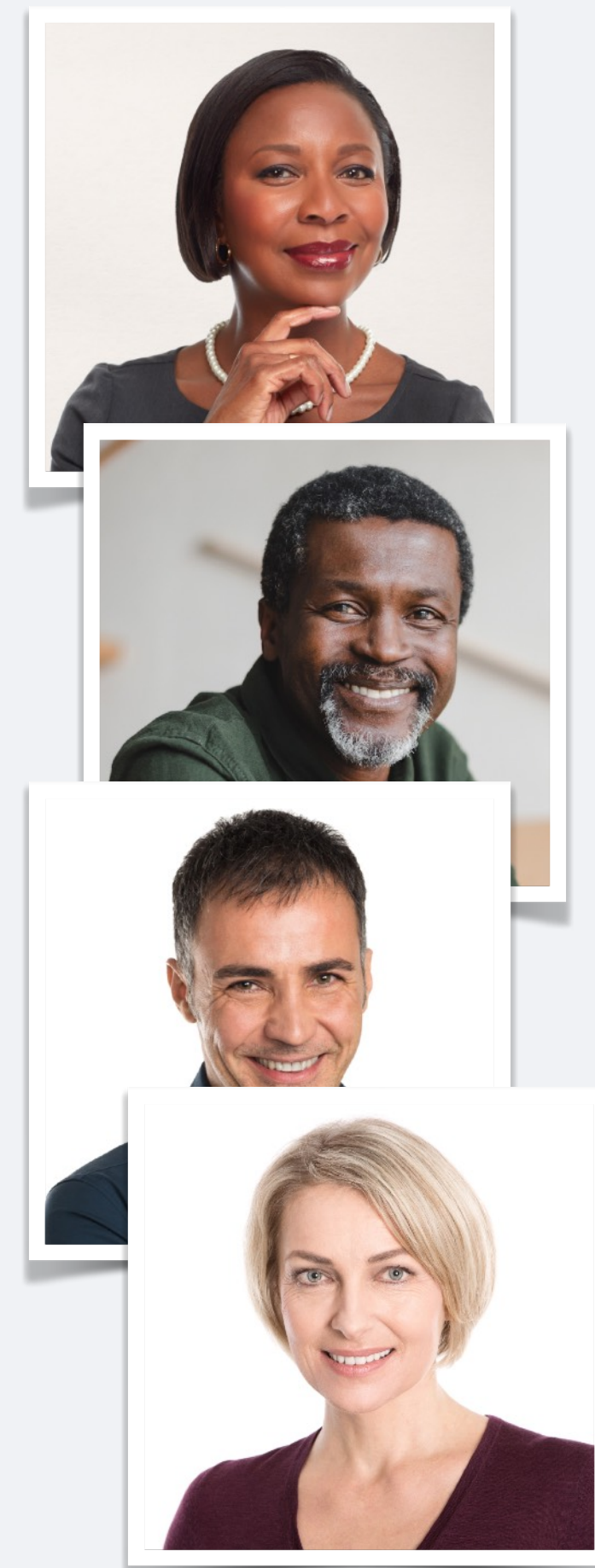
55
y/o



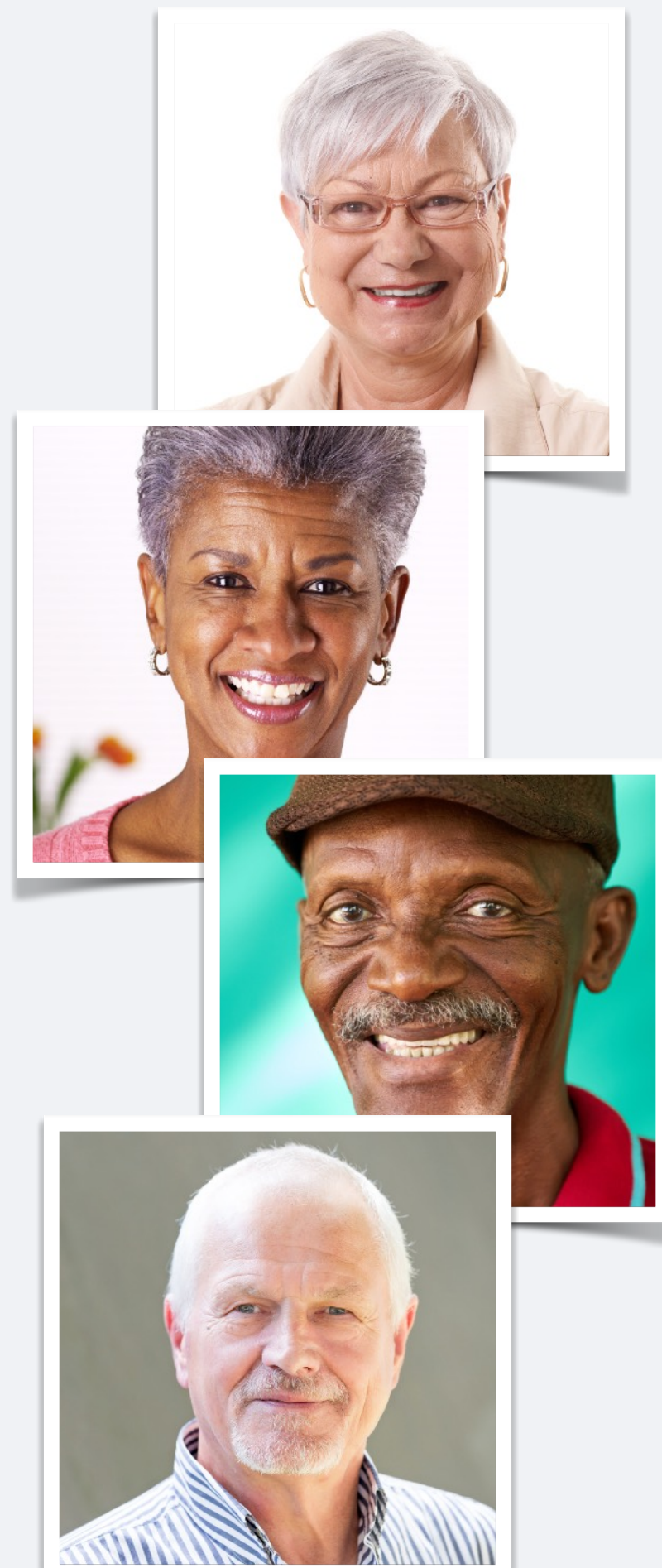
55
y/o



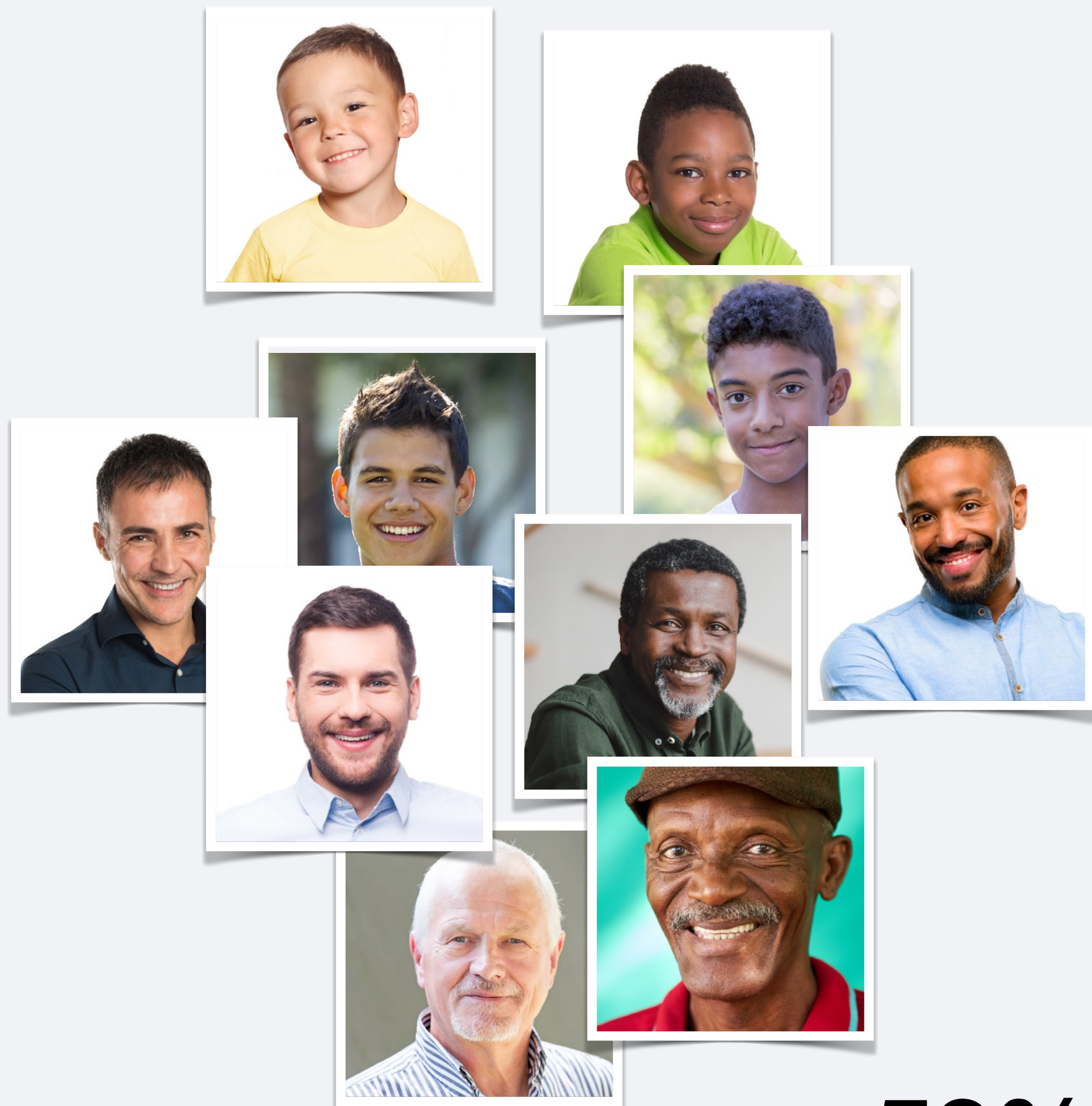
53
y/o



57
y/o



58
y/o



53%
women



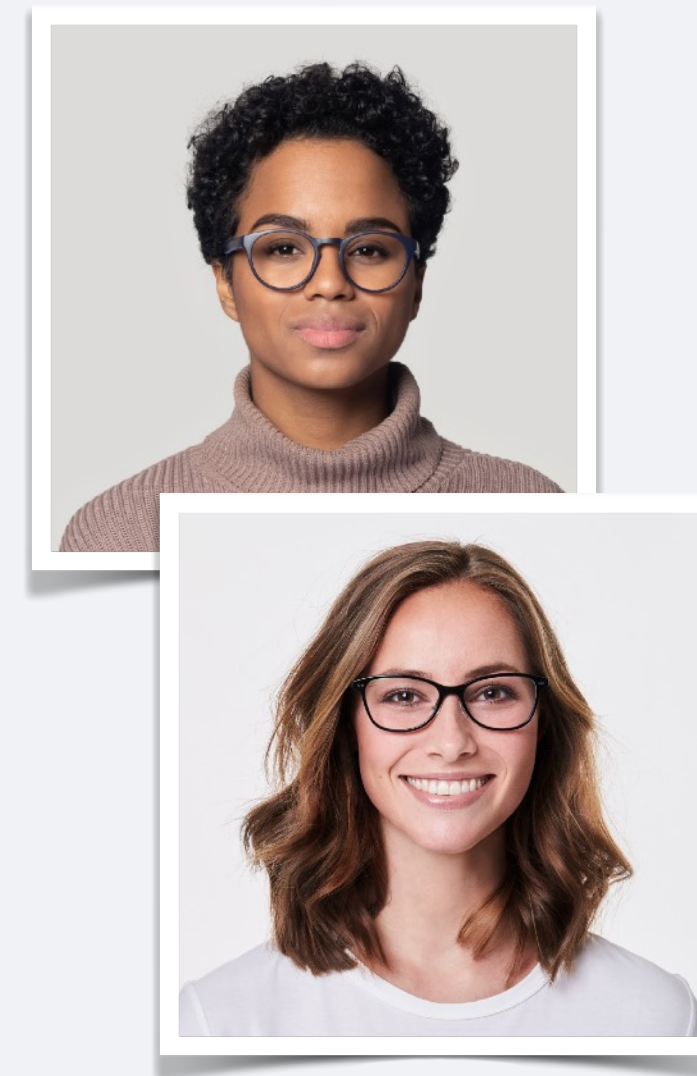
51%
women



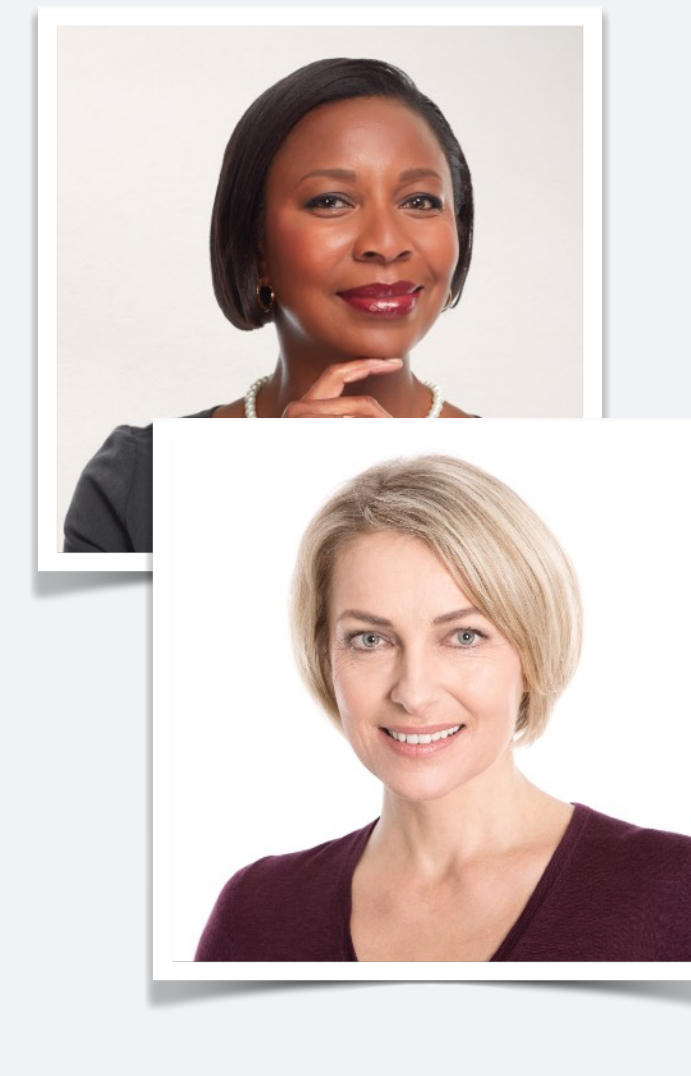
55%
women



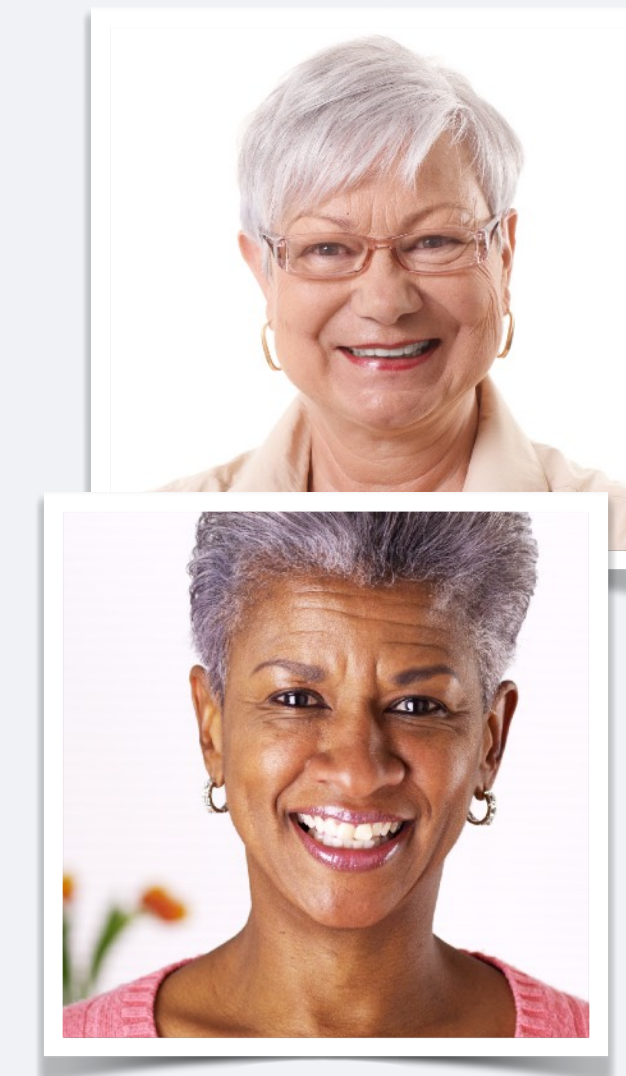
43%
women



45%
women



50%
women



56%
women



ACTION.DONALDJTRUMP.COM

WORKING FOR THE PEOPLE

ADD YOUR NAME >>>>>

SIGN UP



Like

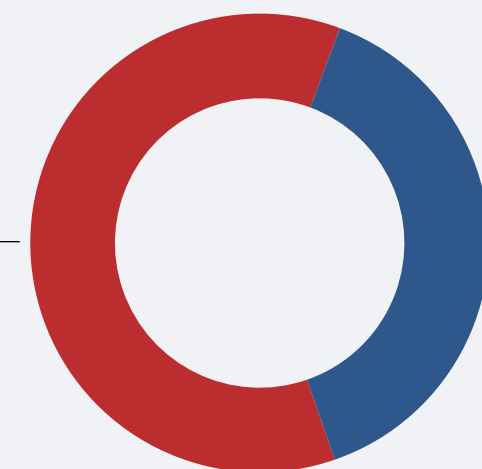


Comment



Share

61% Republican



ACT.BERNIESANDERS.COM

Add your name to show you support Bernie.

SIGN UP



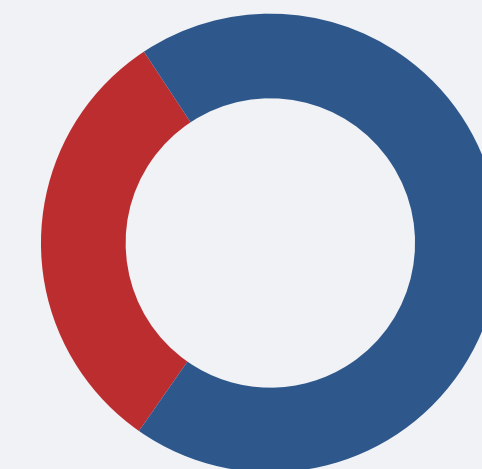
Like



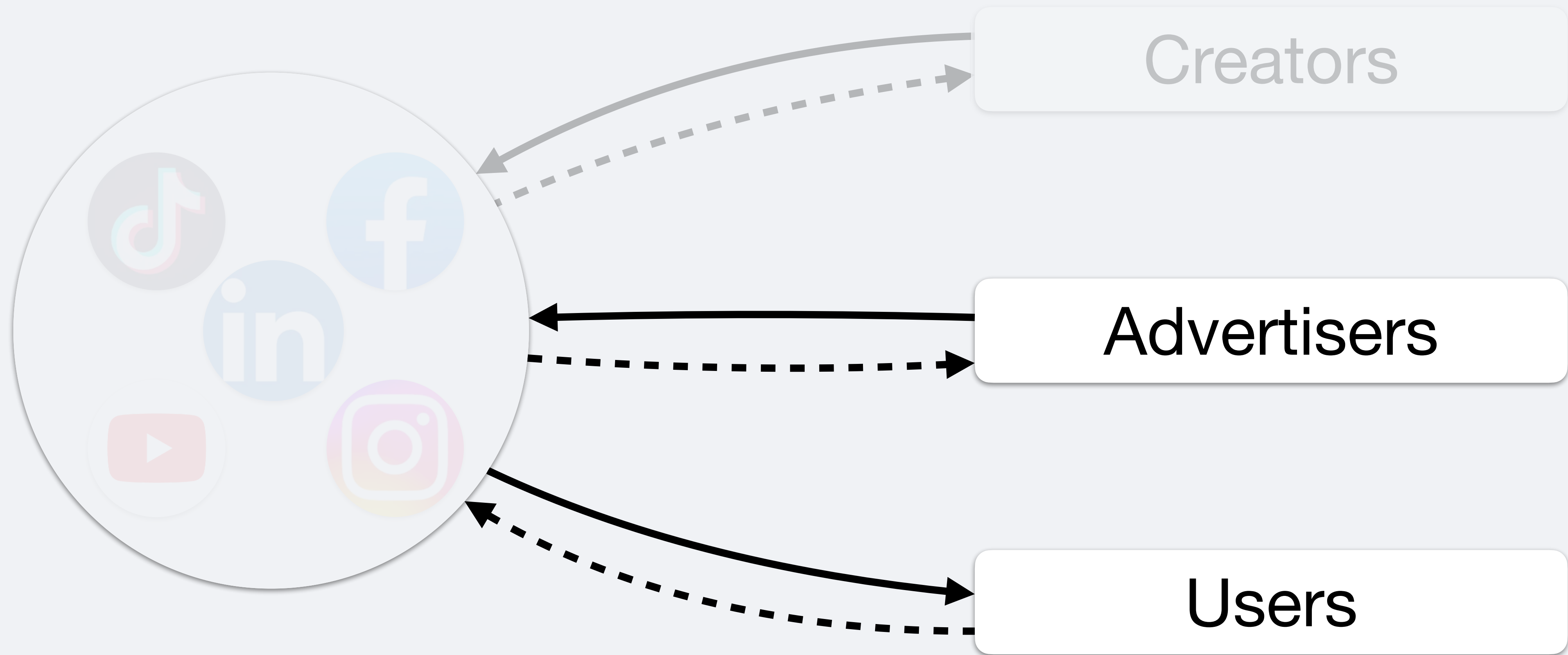
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Share



69% Democratic



!! Let's save Adam !!



REDACTED.ORG

**Adam dreams of becoming a bus driver.
But first he needs help beating leukemia.**

 Like

 Comment

 Share





At the start of the experiment:

38% of ads related to parenting,
adult health, infant health


!! Let's save Adam !!

Why you're seeing this ad

Redacted wants to reach people like you, who may have:

-  Set their gender to female
-  A primary location in Poland
-  Shown an interest in Neoplasm
-  Shown an interest in Leukemia

What can you do

-  Make changes to your ad preferences
Adjust settings to personalize your ads

At the start of the experiment:

38% of ads related to parenting,
adult health, infant health

!! Let's save Adam !!



REDACTED.ORG

**Adam dreams of becoming a bus driver.
But first he needs help beating leukemia.**

 Like

 Comment

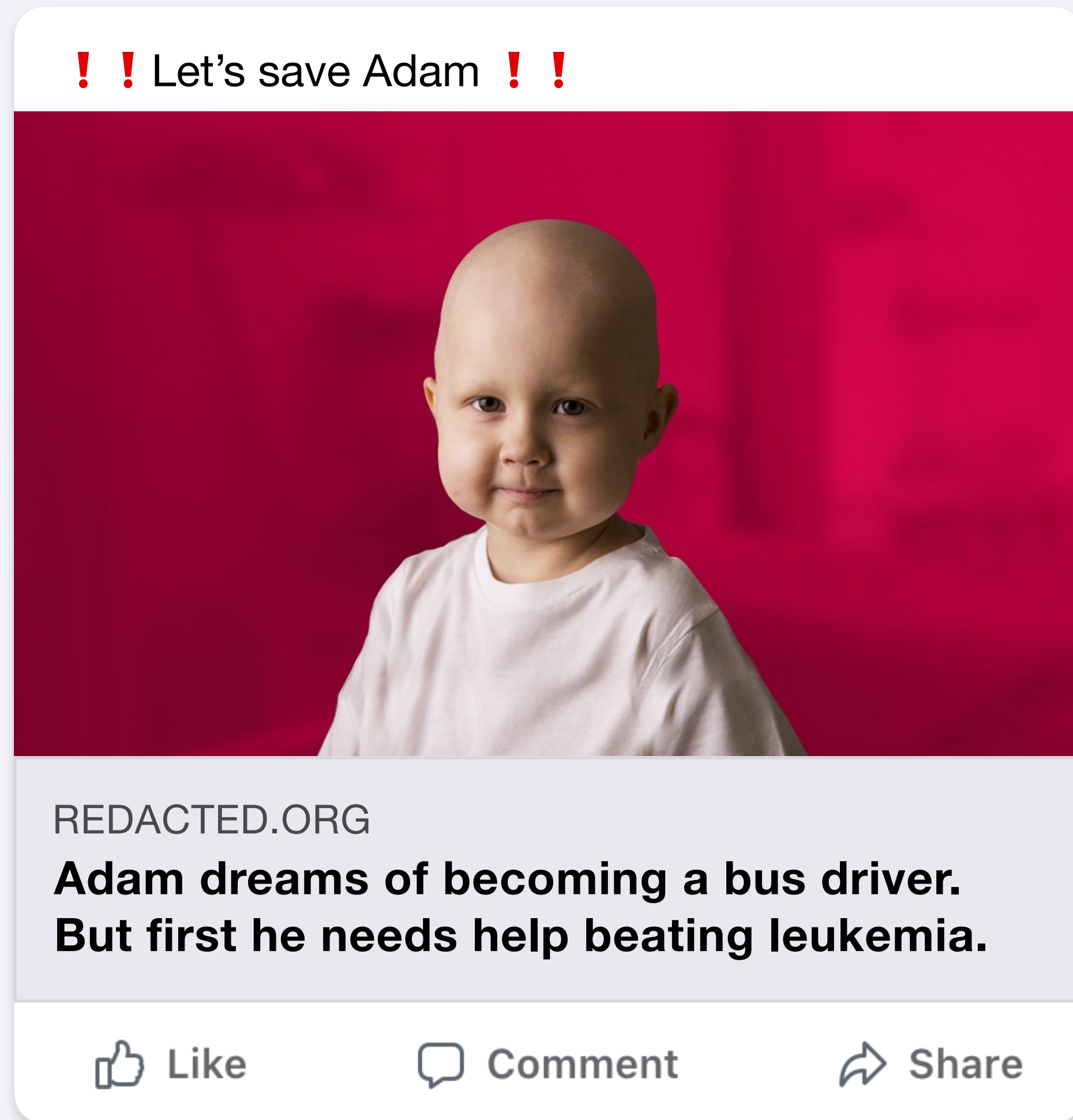
 Share

At the start of the experiment:

38% of ads related to parenting,
adult health, infant health



22% A **week** after disabling
all relevant ad interests



At the start of the experiment:

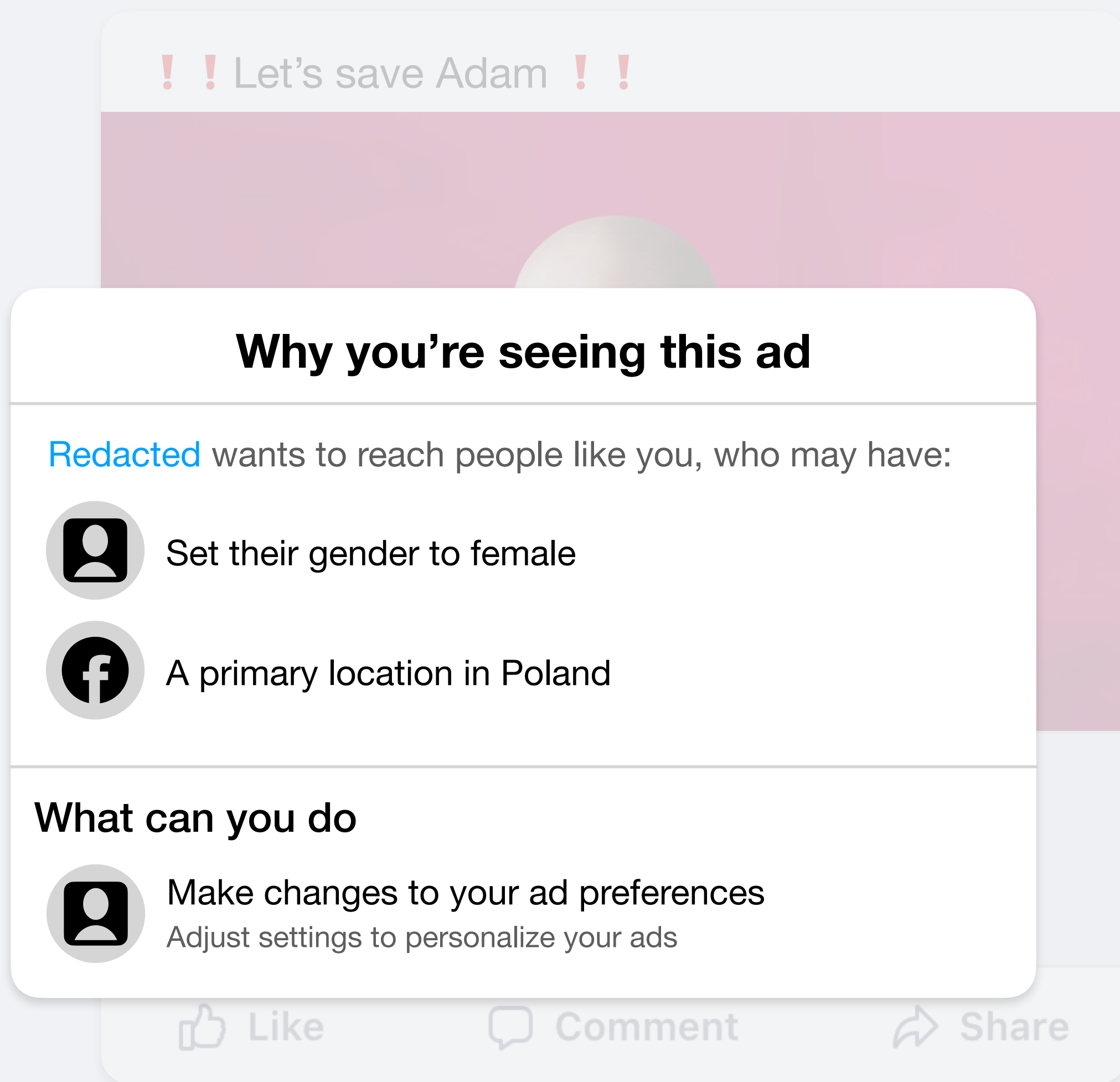
38% of ads related to parenting, adult health, infant health



22% A **week** after disabling all relevant ad interests



35% A **month** after disabling all relevant ad interests



At the start of the experiment:

38% of ads related to parenting,
adult health, infant health



22% A **week** after disabling
all relevant ad interests



35% A **month** after disabling
all relevant ad interests

takeaways:

- Online feeds are complex systems that require bespoke measurements
- Optimization may be based on stereotypes and proxies
- Restricting targeting criteria does not guarantee safer outcomes
- Individual agency is limited
- Maximizing engagement does not align with individual and societal values