
Can Machines Perceive Emotion?

JESSI HEMPEL BUSINESS 04.22.15 8:00 AM

COMPUTERS THAT KNOW HOW YOU FEEL WILL SOON BE EVERYWHERE



GETTY IMAGES

A REPORTER AT LARGE | JANUARY 19, 2015 ISSUE

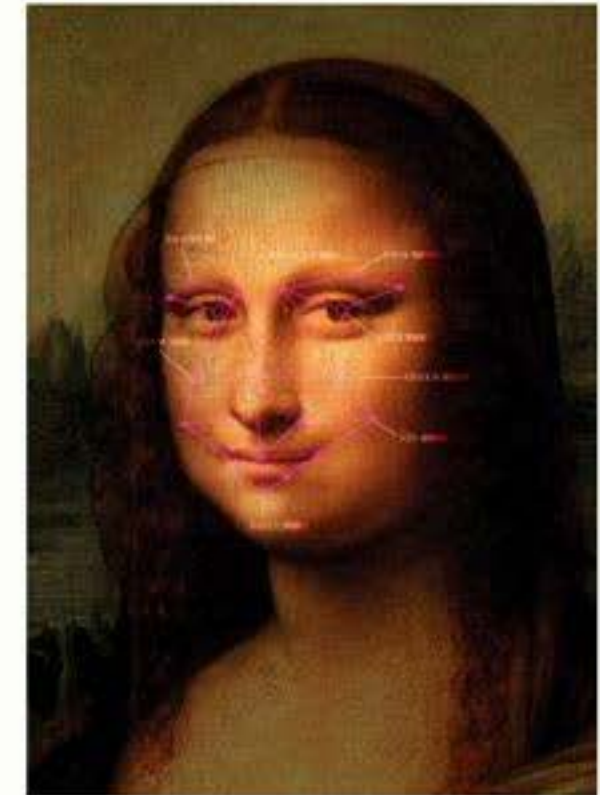
WE KNOW HOW YOU FEEL

Computers are learning to read emotion, and the business world can't wait.

BY RAFFI KHATCHADOURIAN



Three years ago, archivists at A.T. & T. stumbled upon a rare fragment of computer history: a short film that Jim Henson produced for Ma Bell, in 1963. Henson had been hired to make the film for a conference that the company was convening to showcase its strengths in machine-to-machine communication. Told to devise a faux robot that believed it functioned better than a person, he came up with a cocky, boxy, jittery, bleeping Muppet on wheels. "This is computer H14," it proclaims as the film begins. "Data program readout: number fourteen ninety-two per cent H2SOSO." (Robots of that era always seemed obligated to initiate speech with senseless jargon.) "Begin subject: Man and the Machine," it continues. "The machine possesses supreme intelligence, a faultless memory, and a beautiful soul." A blast of exhaust from one of its ports vaporizes a



By scanning your face, computers can decode your unspoken reaction to a movie, a political debate, even a video call with a friend.

ILLUSTRATION BY BRYAN CHRISTIE



TECH

Apple Buys Artificial-Intelligence Startup Emotient

Emotient technology is used to assess emotions by reading facial expressions

By *Rolfe Winkler, Daisuke Wakabayashi and Elizabeth Dwoskin*

Updated Jan. 7, 2016 1:13 p.m. ET

Apple Inc. has purchased Emotient Inc., a startup that uses artificial-intelligence technology to read people's emotions by analyzing facial expressions.

It isn't clear what Apple plans to do with Emotient's technology, which was primarily sold to advertisers to help assess viewer reactions to their ads. Doctors also have tested it to interpret signs of pain among patients unable to express themselves, and a retailer

used it to...

RELATED VIDEO



Why New Technology May Know How You Feel

Recommended Videos

- 1. Houston's 'We Have a Problem' Problem
- 2. A Tale of Two Hong Kong Traders
- 3. Teach Amazon Echo to Recognize Your Voice
- 4. Take a Tour of an Artist's Stunning New York Townhouse



TECH

Apple Buys Artificial-Intelligence Startup Emotient

Emotient technology is used to assess emotions by reading facial expressions

By Rolfe Winkler, Daisuke Wakabayashi and Elizabeth Dwoskin

Updated Jan. 7, 2016 1:13 p.m. ET

Apple Inc. has purchased Emotient Inc., a startup that uses artificial-intelligence technology to read people's emotions by analyzing facial expressions.

It isn't clear what Apple plans to do with Emotient's technology, which was primarily sold to advertisers to help assess viewer reactions to their ads. Doctors also have tested it to interpret signs of pain among patients unable to express themselves, and a retailer used it to...

RELATED VIDEO



Why New Technology May Know How You Feel

Recommended Videos

- 1. Houston's 'We Have a Problem' Problem
- 2. A Tale of Two Hong Kong Traders
- 3. Teach Amazon Echo to Recognize Your Voice
- 4. Take a Tour of an Artist's Stunning New York Townhouse



Emotion API **PREVIEW**

Analyze faces to detect a range of feelings and personalize your app's responses.

Explore Cognitive Services: [Documentation](#) [API](#) [SDK](#) [Pricing](#) [Portal](#) [Try Emotion API](#) [Stack Overflow](#)

Recognize emotions in images

The Emotion API takes a facial expression in an image as an input, and returns the confidence across a set of emotions for each face in the image, as well as bounding box for the face, using the Face API. If a user has already called the Face API, they can submit the face rectangle as an optional input.

The emotions detected are anger, contempt, disgust, fear, happiness, neutral, sadness, and surprise. These emotions are understood to be cross-culturally and universally communicated with particular facial expressions.

Emotion API PREVIEW

Analyze faces to detect a range of feelings and personalize your app's responses.

Recognize emotions in images

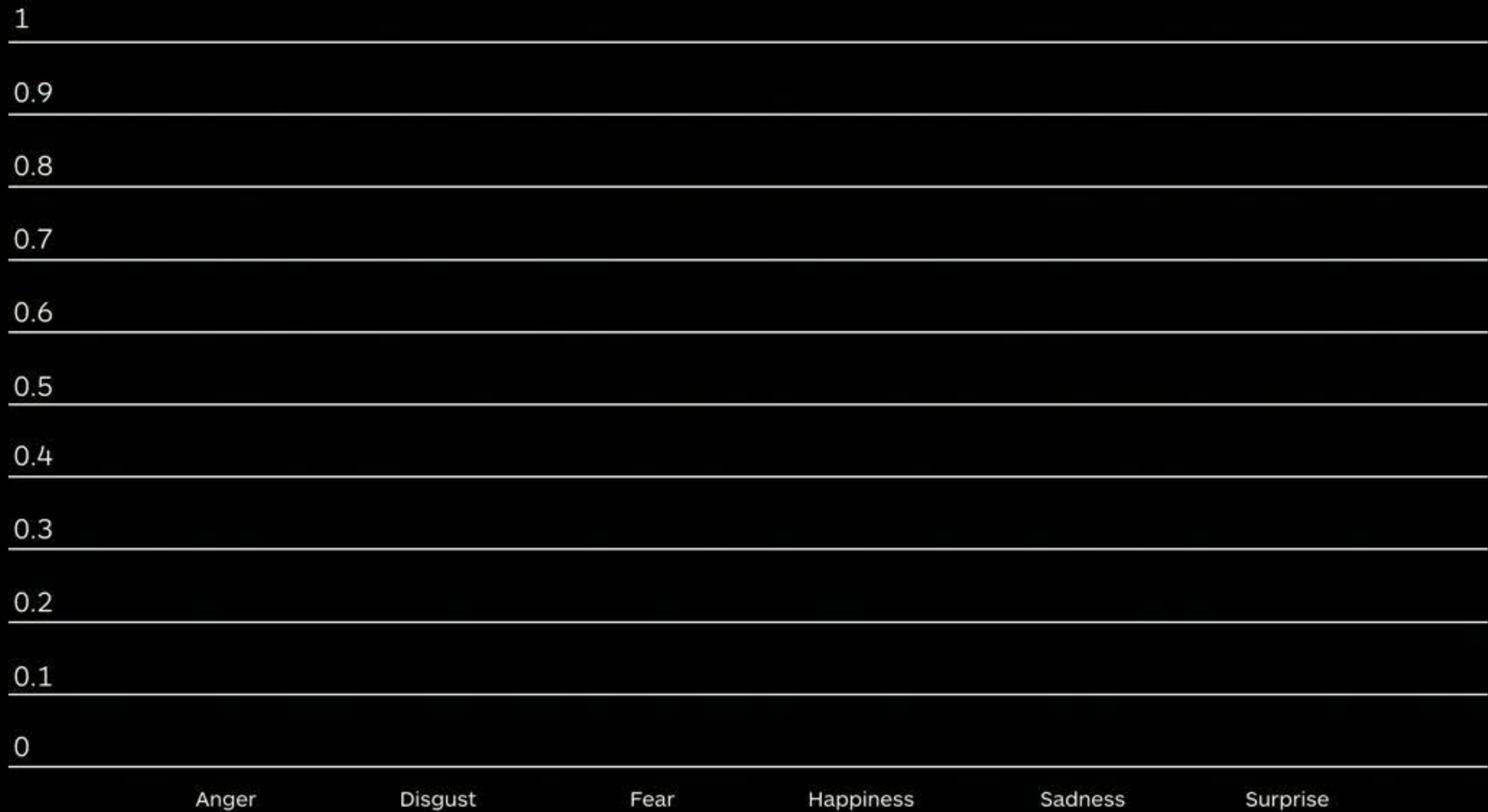
The Emotion API takes a facial expression in an image as an input, and returns the confidence across a set of emotions for each face in the image, as well as bounding box for the face, using the Face API. If a user has already called the Face API, they can submit the face rectangle as an optional input.

The emotions detected are anger, contempt, disgust, fear, happiness, neutral, sadness, and surprise. These emotions are understood to be cross-culturally and universally communicated with particular facial expressions.





Facial Movements vs. Perceptions



Facial Movements vs. Perceptions

1

0.9

0.8

0.7

0.6

0.5

0.4

0.3

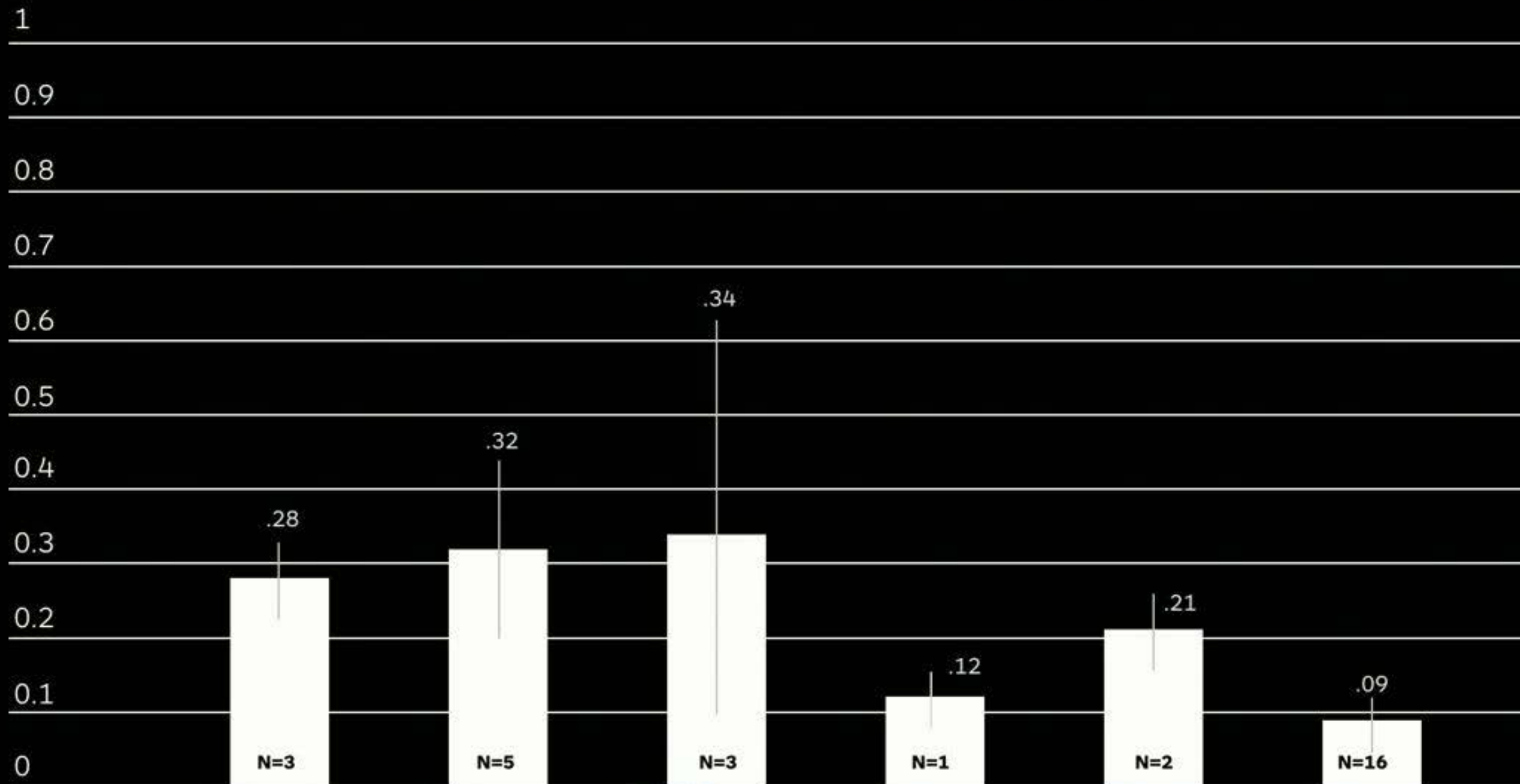
0.2

0.1

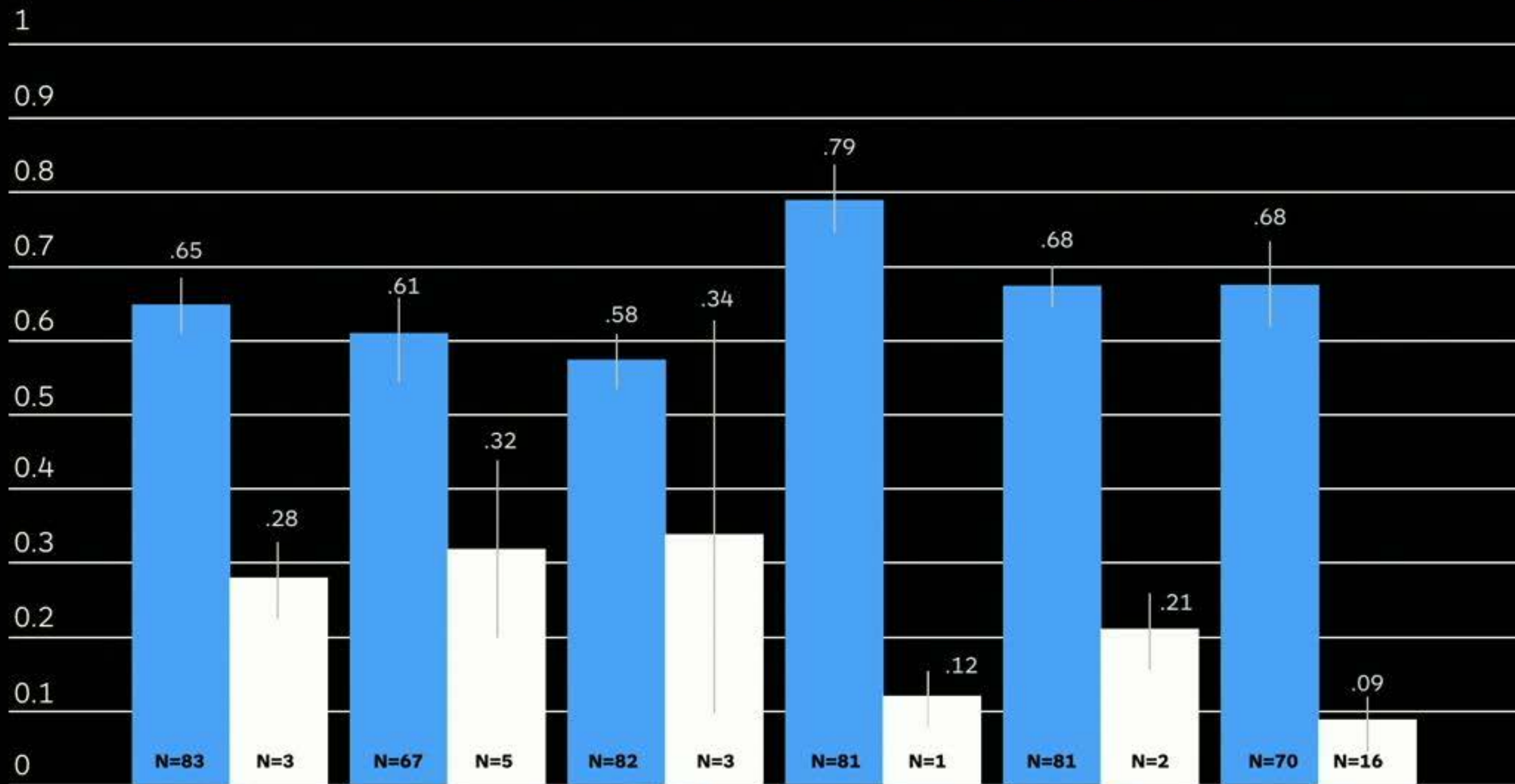
0



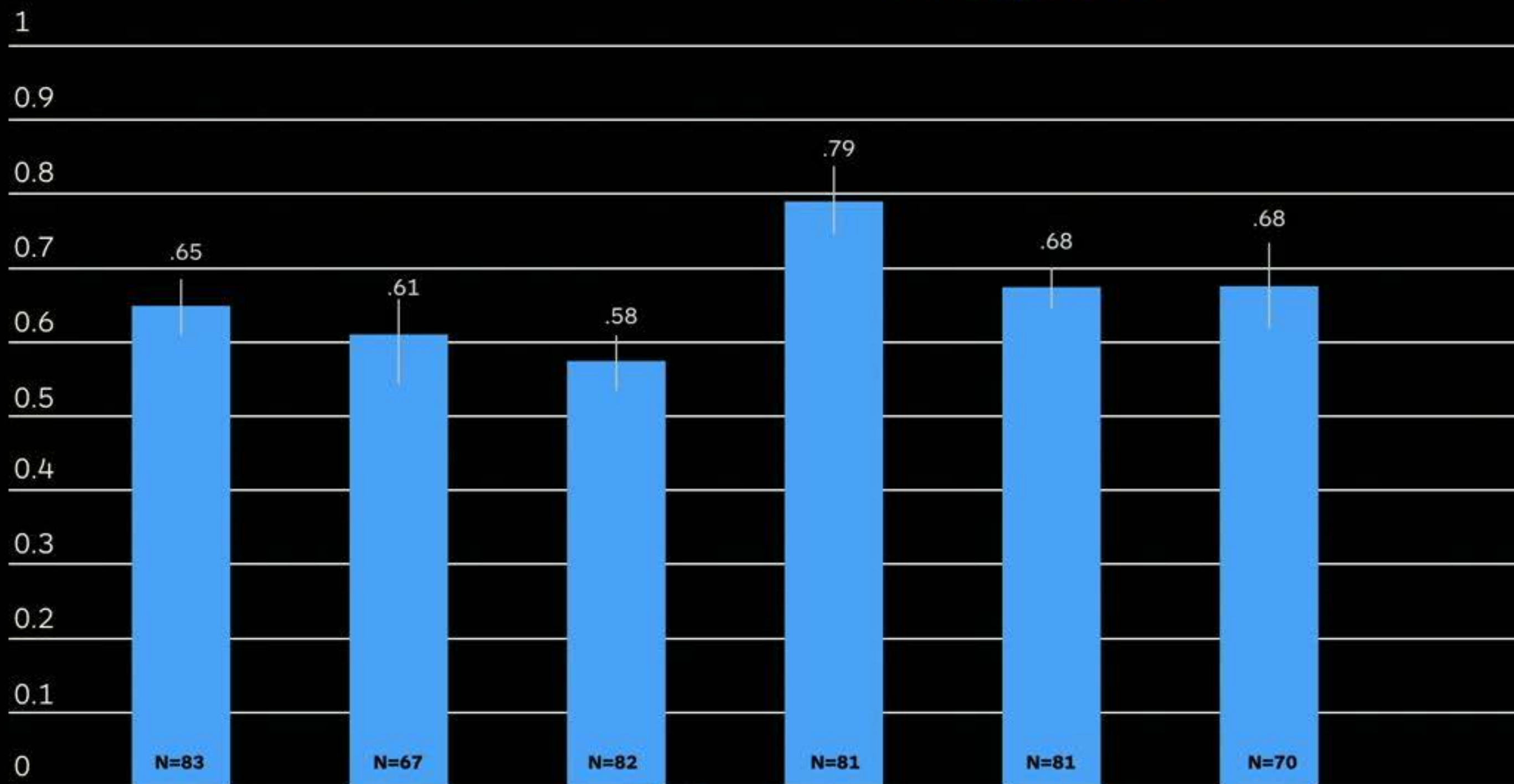
Facial Movements vs. Perceptions

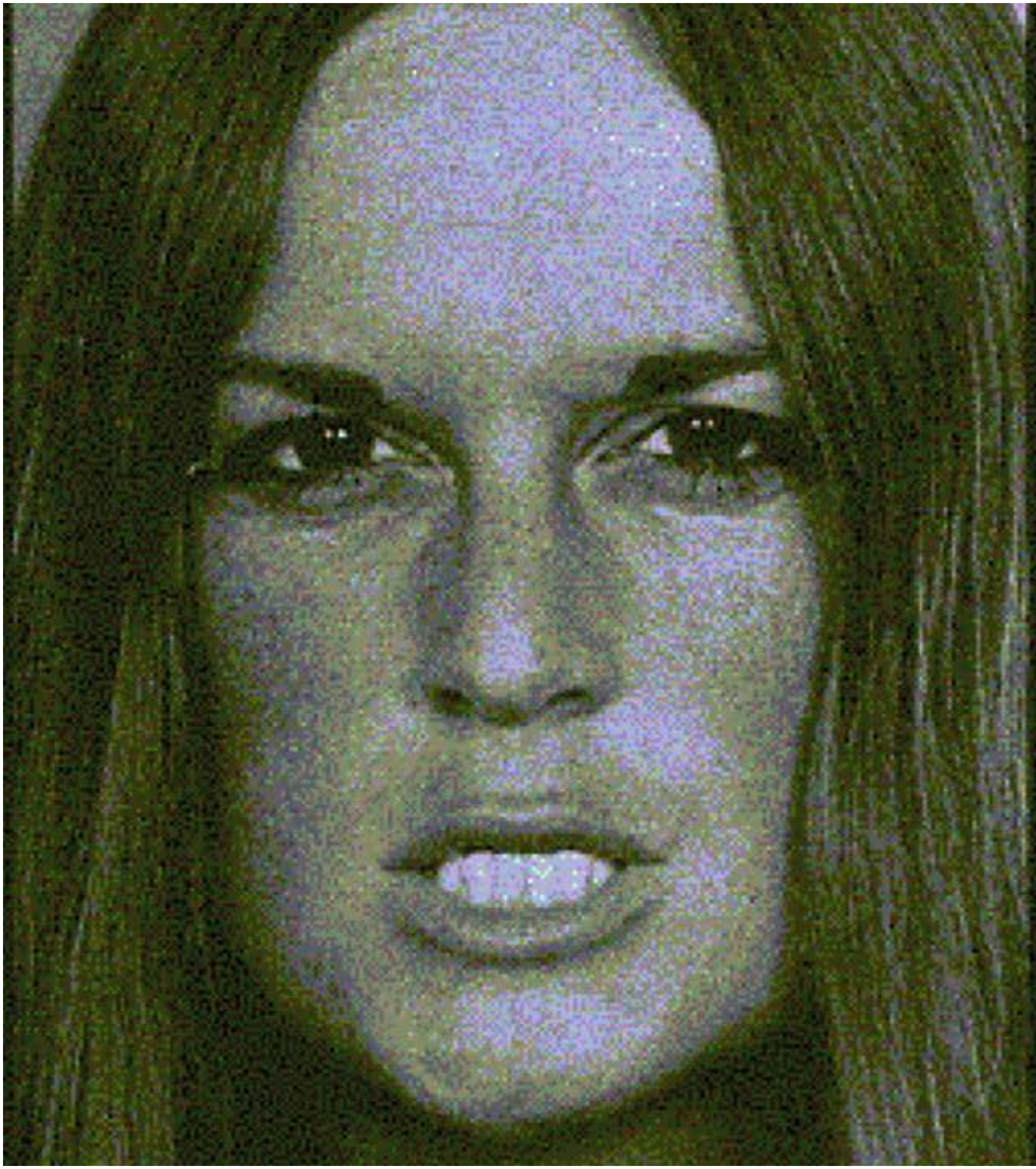


Facial Movements vs. Perceptions



Facial Movements vs. Perceptions



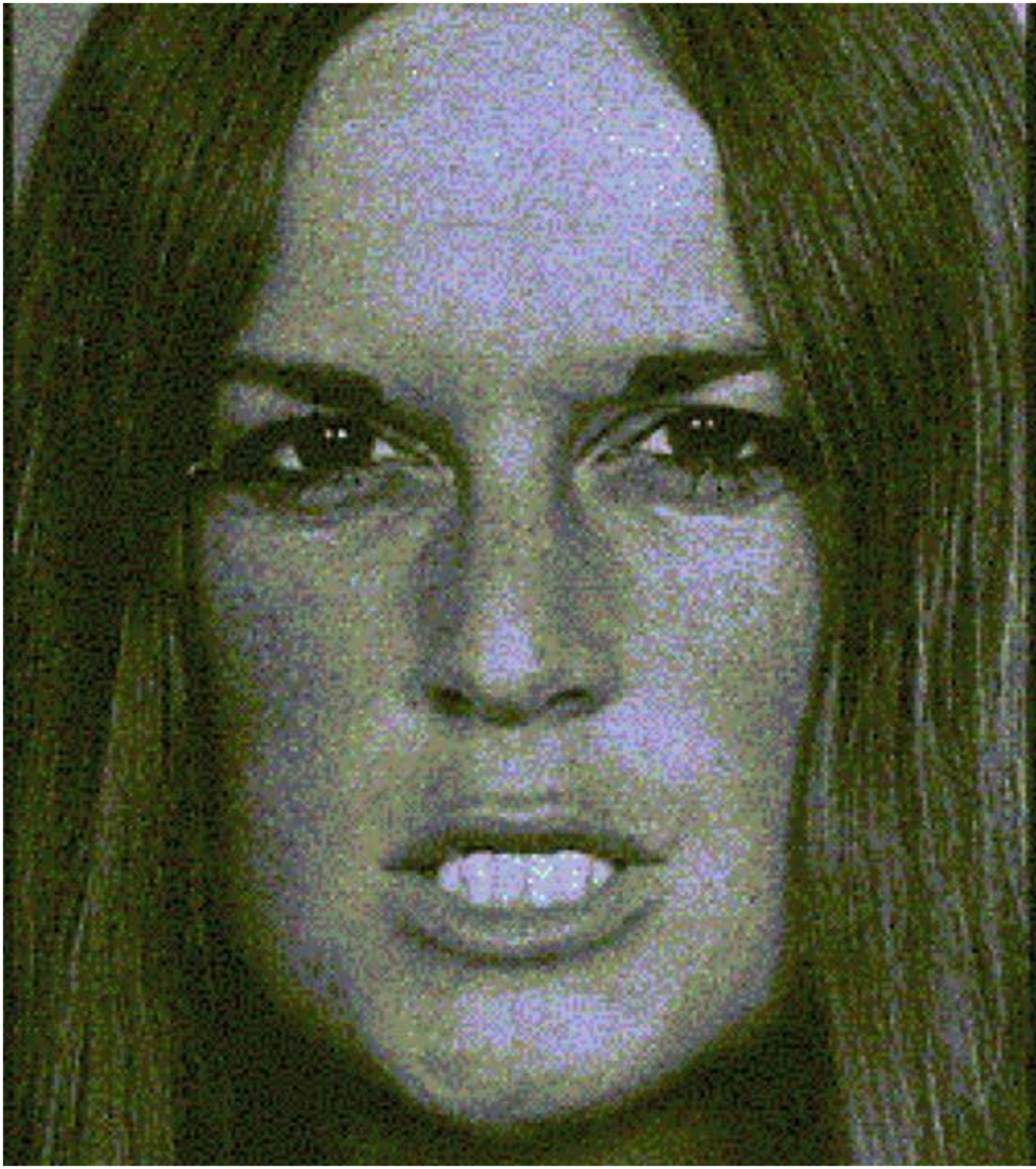


Sad
Afraid
Angry
Happy
Surprised

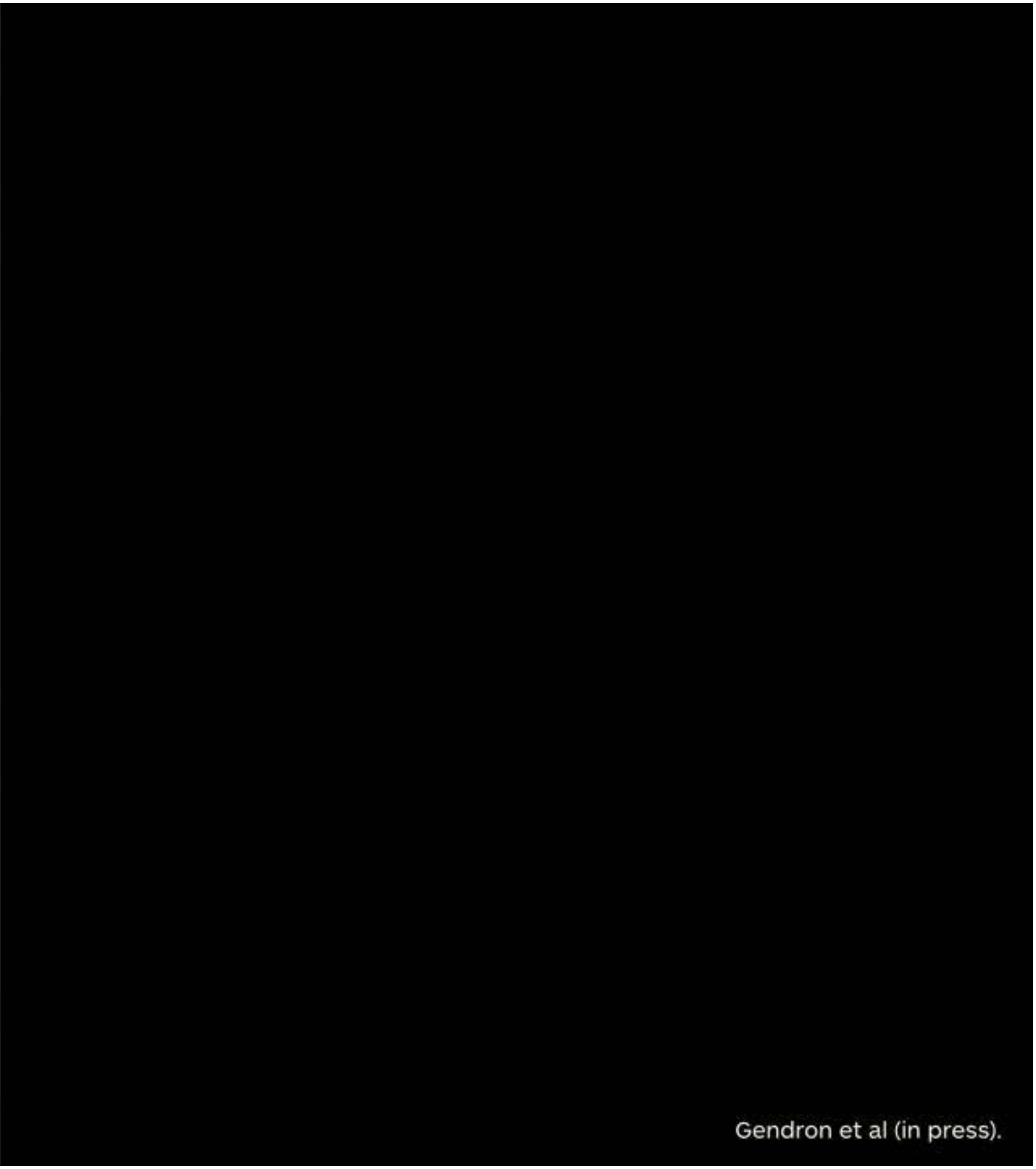


67%

Surprised



36%





25%

The image is a composite graphic. On the left side, there is a grayscale photograph of a man's face, looking directly at the camera with a neutral expression. The right side of the image is a solid black background. Overlaid on this background is the text '19%' in a large, white, sans-serif font. The '1' is positioned over the man's face, while the '9' and '%' are on the black background.

19%

Gigil

The overwhelming urge to squeeze or pinch something that is very cute

Greng jai

The feeling you get when you don't want someone to do something for you because it would be a pain for them

Glückschmerz

Displeasure derived from another's pleasure

Itoshii

Bittersweet longing for an absent loved one

Lajja

Respectful restraint or playful shame; pleasant adherence to social norms

Liget

Intense focus, passion, and energy associated with actively pursuing a challenge

Gigil

The overwhelming urge to squeeze or pinch something that is very cute

Greng jai

The feeling you get when you don't want someone to do something for you because it would be a pain for them

Glückschmerz

Displeasure derived from another's pleasure

Itoshii

Bittersweet longing for an absent loved one

Lajja

Respectful restraint or playful shame; pleasant adherence to social norms

Liget

Intense focus, passion, and energy associated with actively pursuing a challenge

Gigil

The overwhelming urge to squeeze or pinch something that is very cute

Grosser Reiz

The feeling you get when you don't want someone for yourself because it could be a

Glaesche Schmerz

Displeasure derived from a lack of pleasure

Itoshii

Bitterness or longing for an achievement

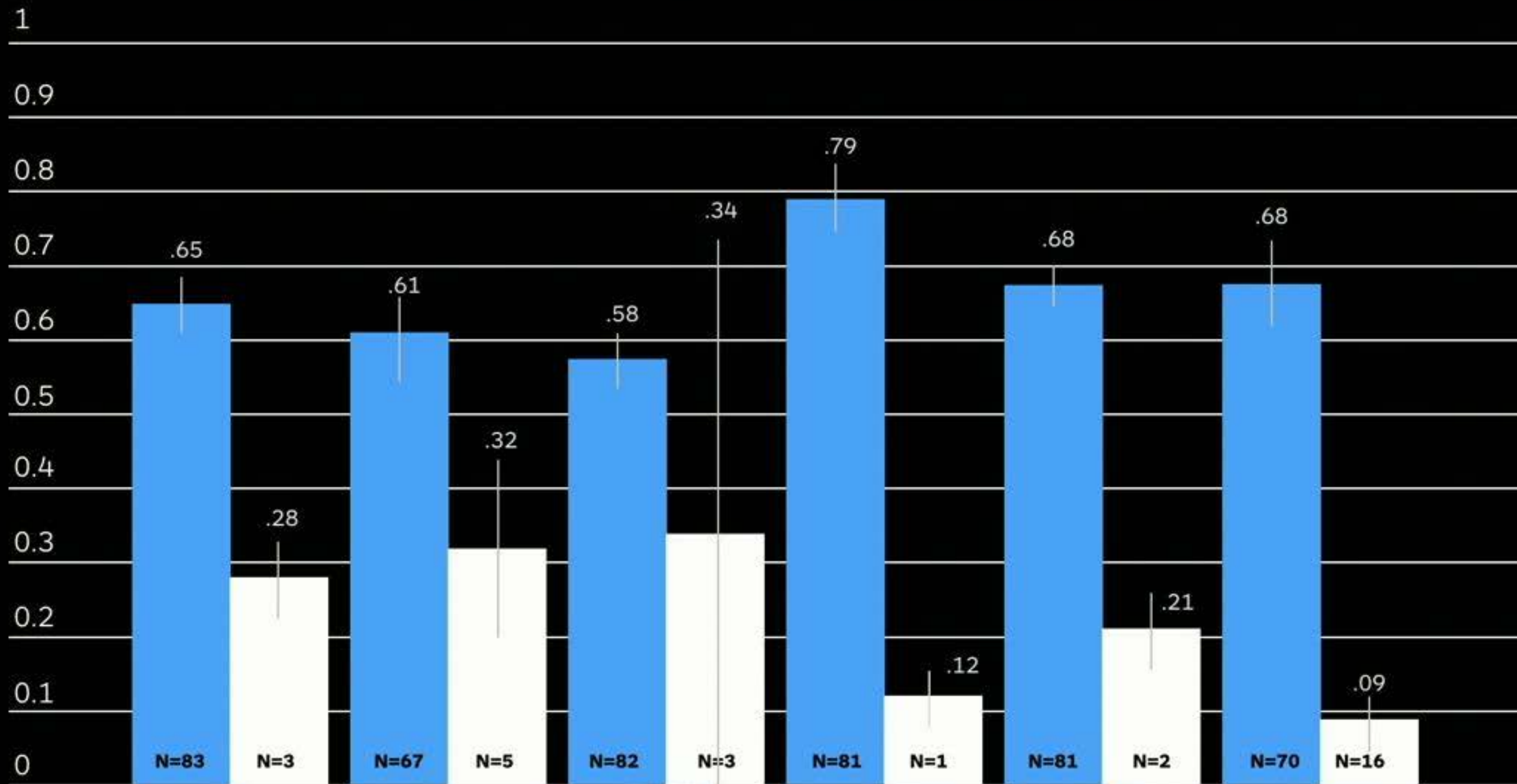
Lajje

Respectful restraint or painful shame; pleasant adherence to social norms

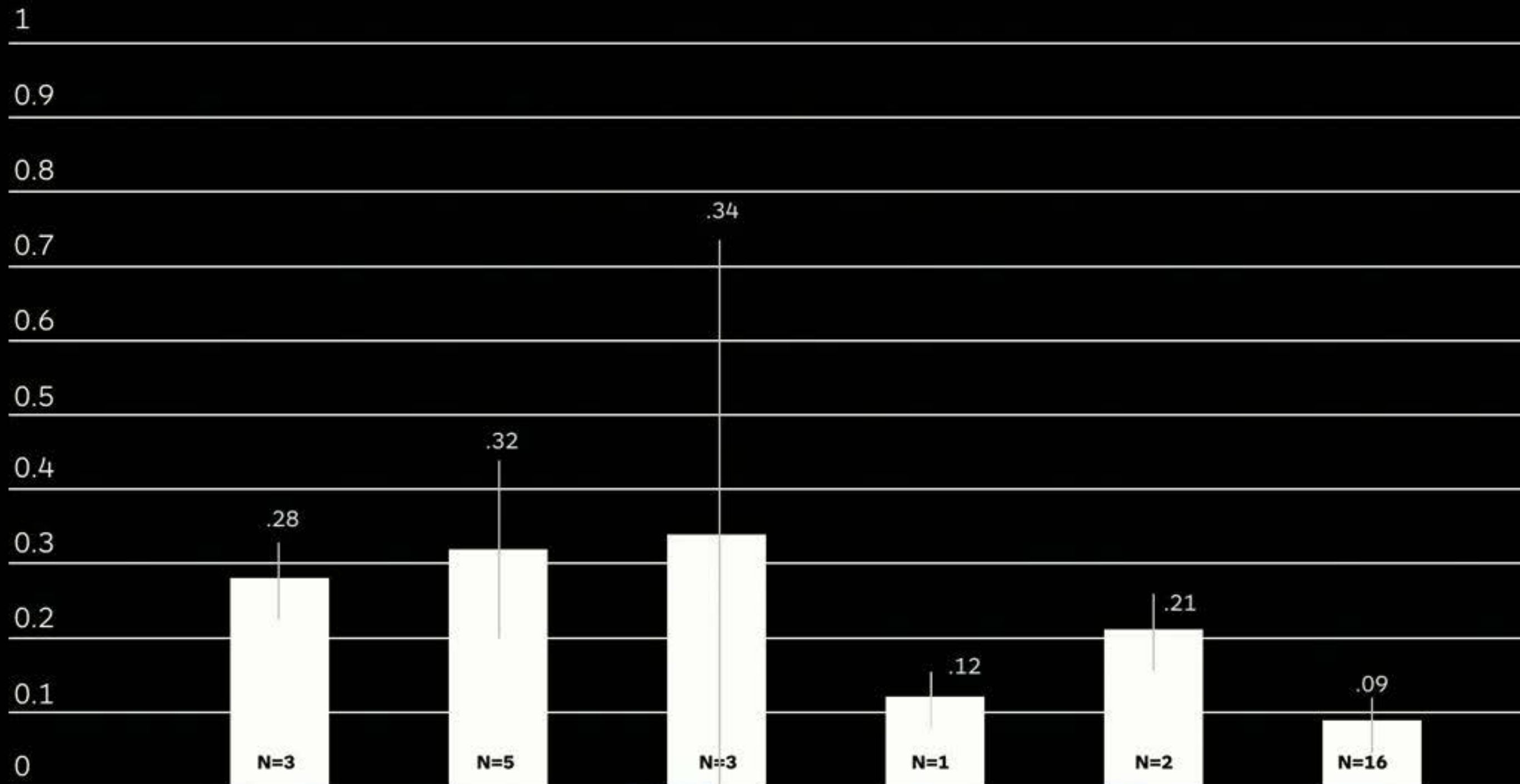
Liget

Intense focus, passion, and energy associated with actively pursuing a challenge

Facial Movements vs. Perceptions



Facial Movements vs. Perceptions



VARIATION IS THE NORM





Barrett (2011). Current Directions in Psychological Science
Barrett et al. (2019). Psychological Science in the Public Interest



Barrett (2011). *Current Directions in Psychological Science*
Barrett et al. (2019). *Psychological Science in the Public Interest*



Photo courtesy of Linda Camras



Barrett (2011). *Current Directions in Psychological Science*
Barrett et al. (2019). *Psychological Science in the Public Interest*



Photo courtesy of Linda Camras

Barrett (2011). *Current Directions in Psychological Science*
Barrett et al. (2019). *Psychological Science in the Public Interest*

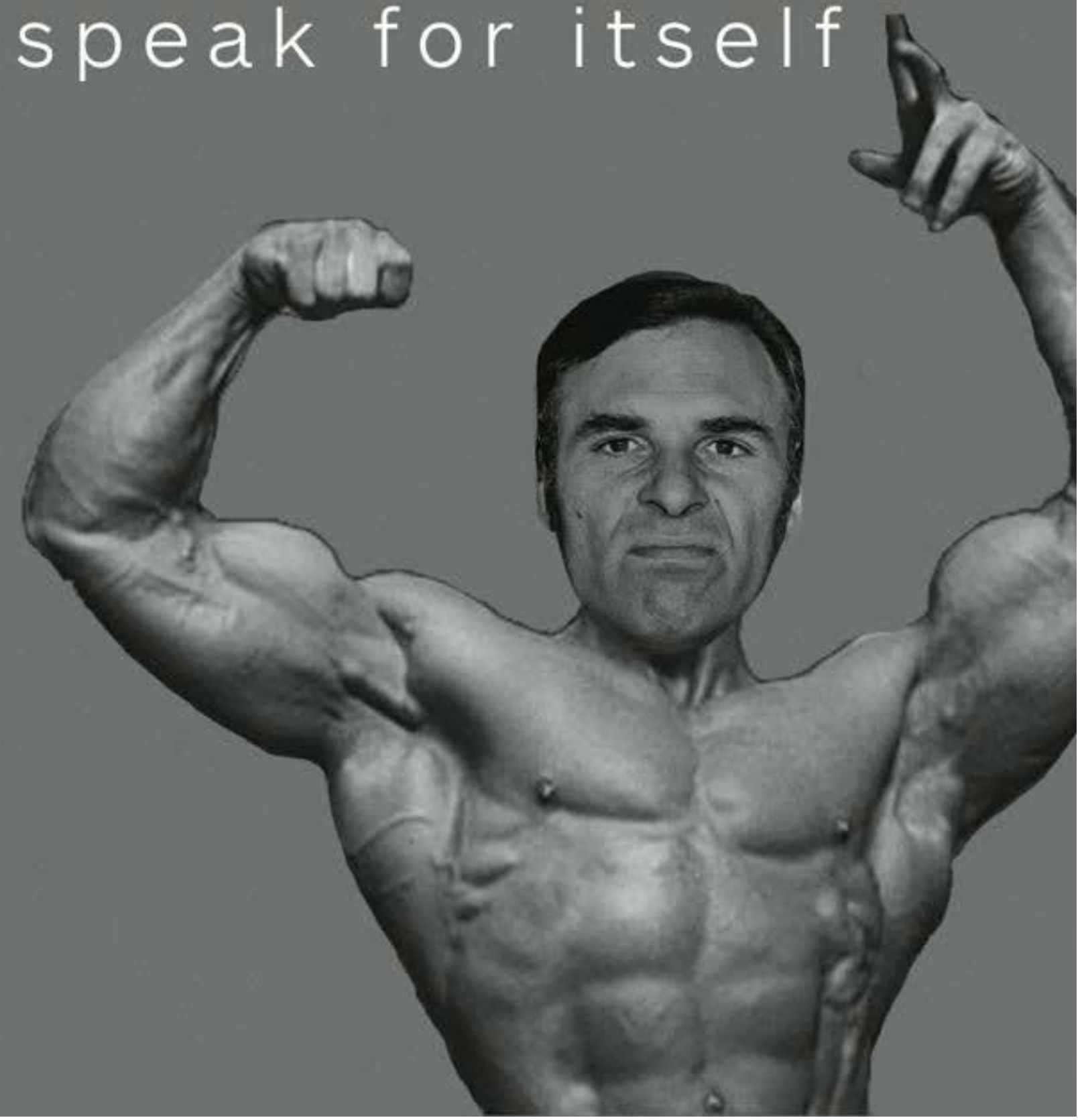




A face does not speak for itself

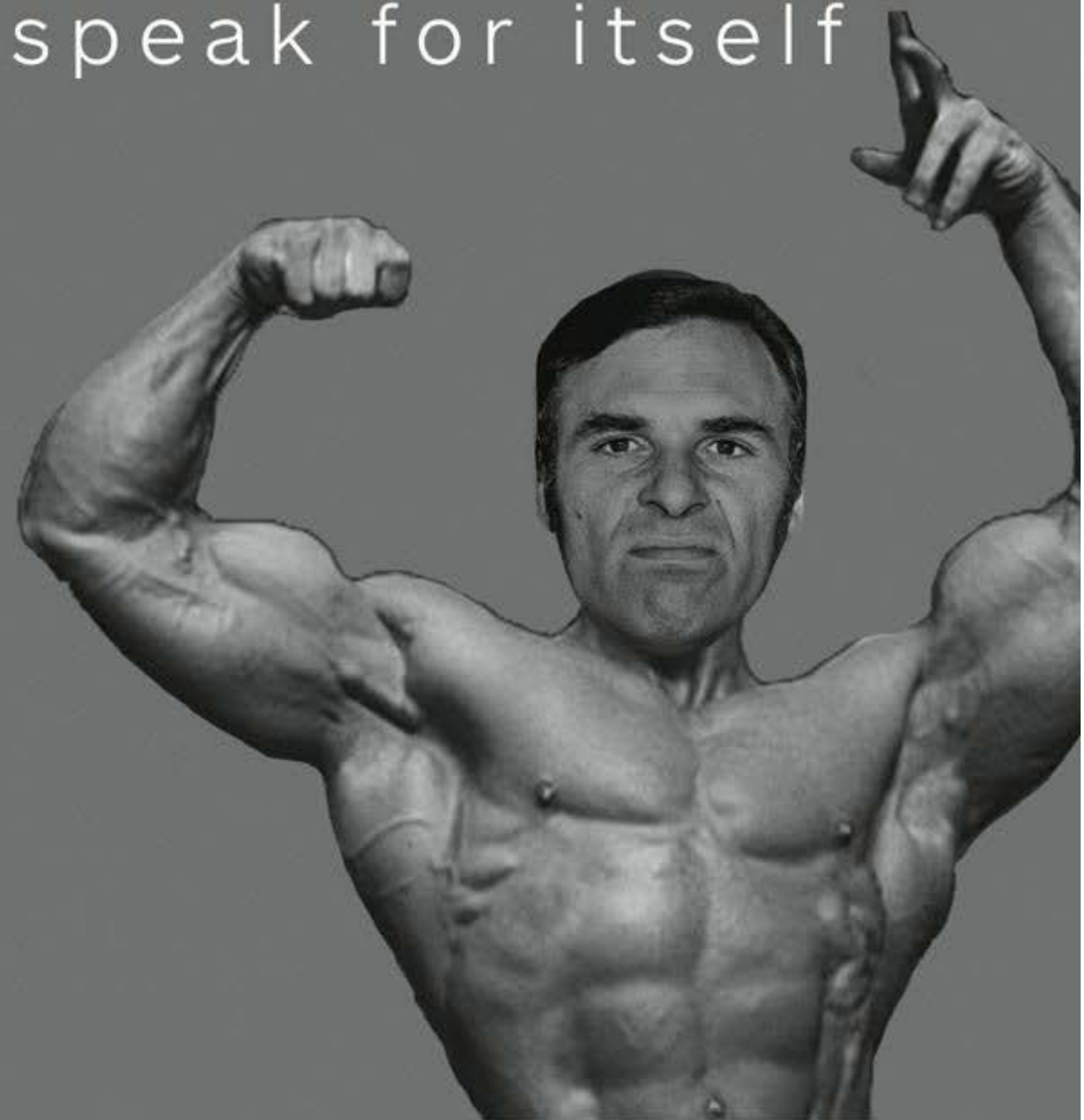
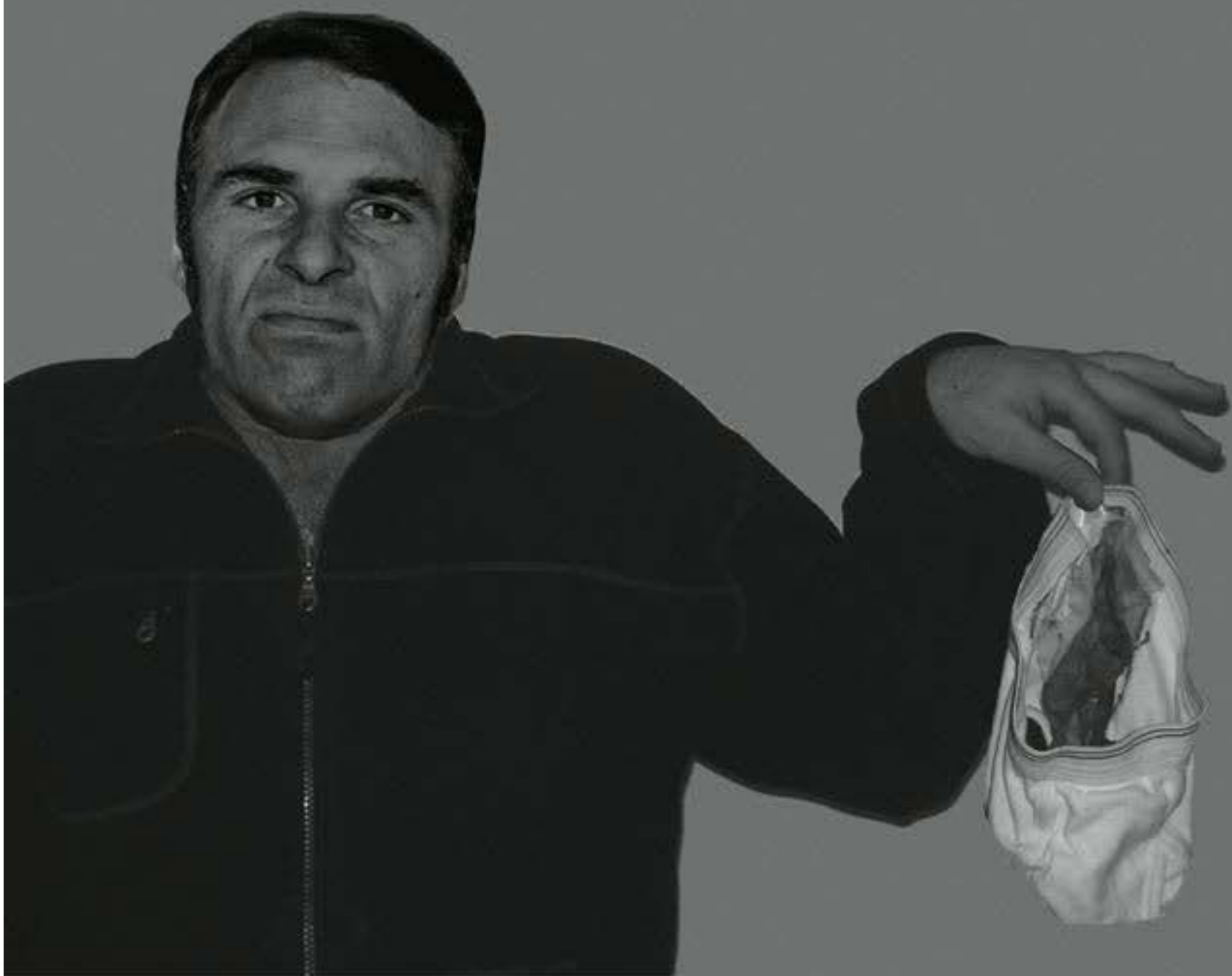
Thanks to Hillel Aviezer for these photos

A face does not speak for itself



Thanks to Hillel Aviezer for these photos

A face does not speak for itself









STEREOTYPES













Things you cannot
bring through airport
security



Barrett (2012). Emotions are real. *Emotion*.

Barrett (2017). *How Emotions Are Made: The Secret Life of the Brain*

CATEGORY CONSTRUCTION PROBLEM

Things you cannot
bring through airport
security

A water bottle, a handgun, and an elephant are arranged horizontally across the center of the slide. The water bottle is on the left, the handgun is in the middle, and the elephant is on the right. The red text is overlaid on these images.

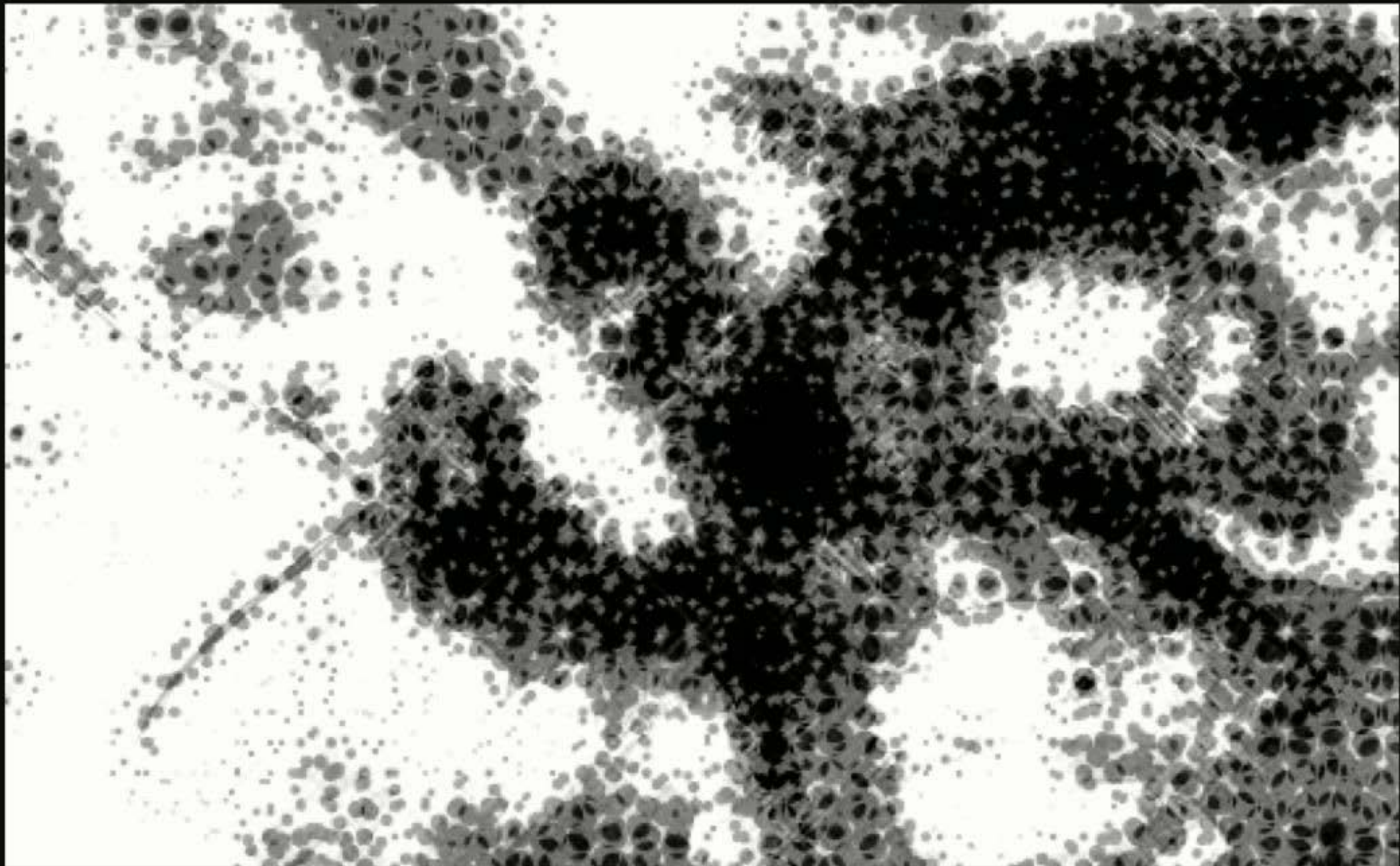
Barrett (2012). Emotions are real. *Emotion*.

Barrett (2017). *How Emotions Are Made: The Secret Life of the Brain*

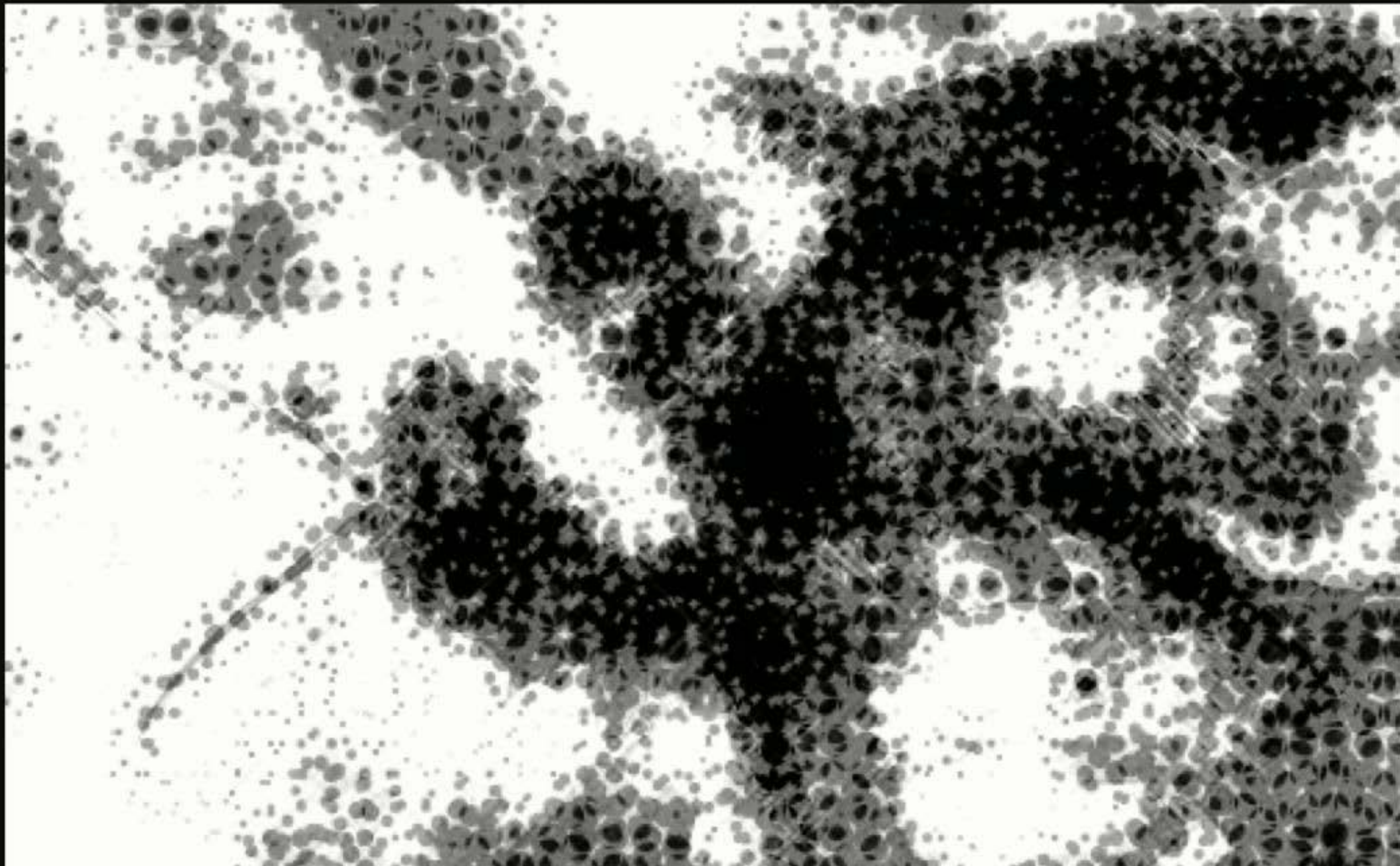


JOY

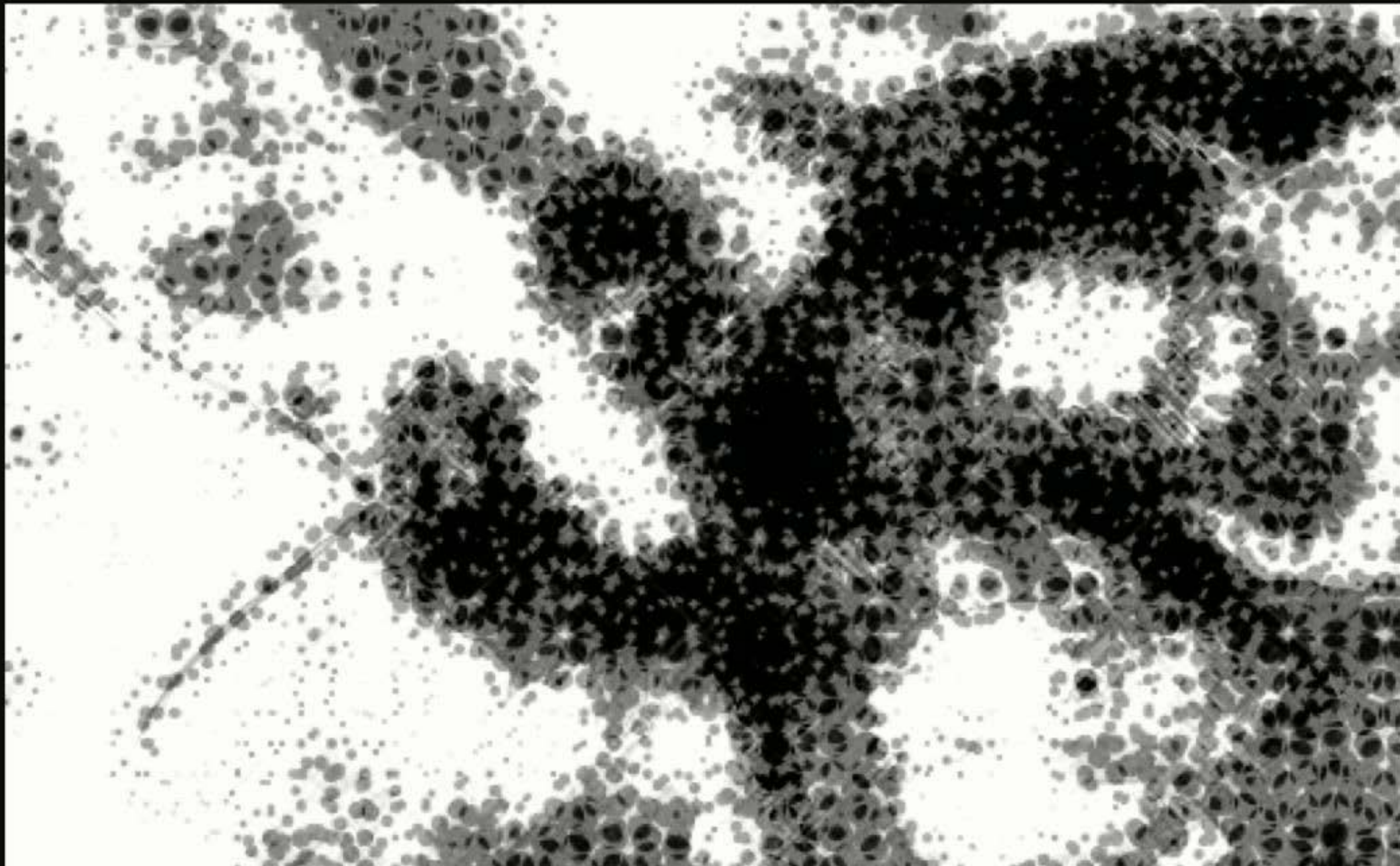
Emotions are not built in.
They're built.



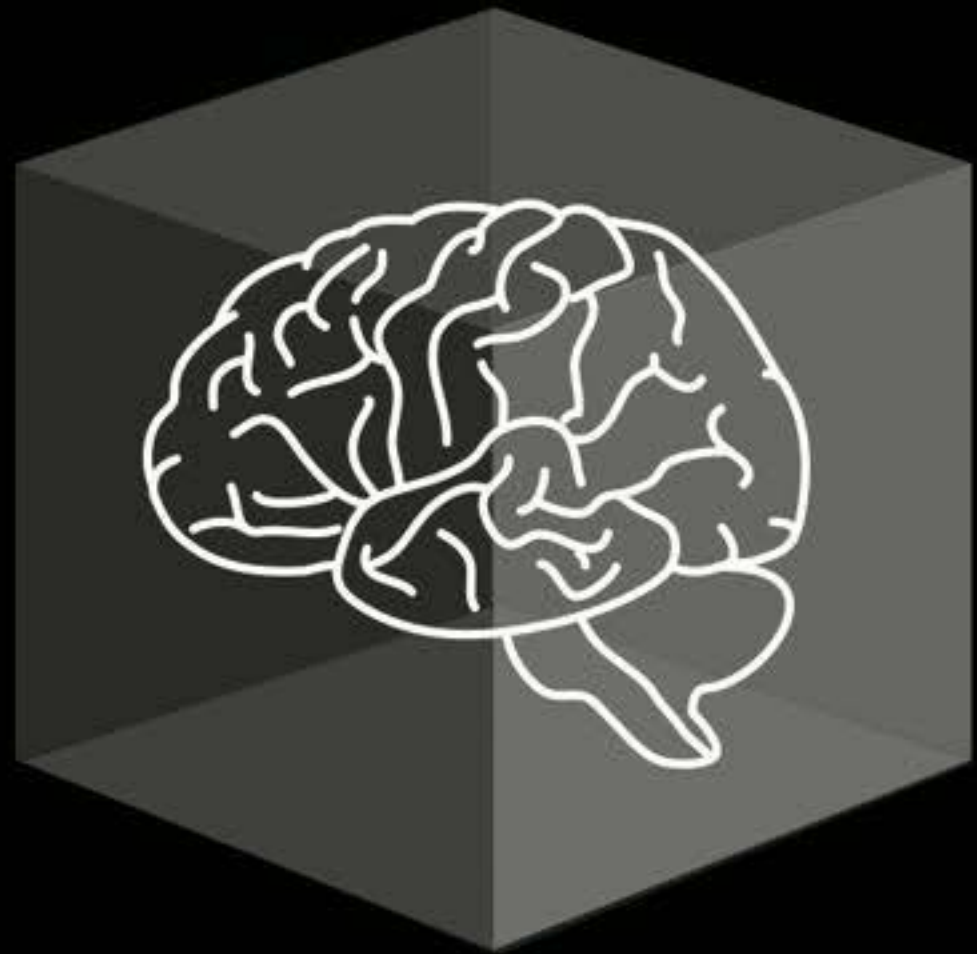




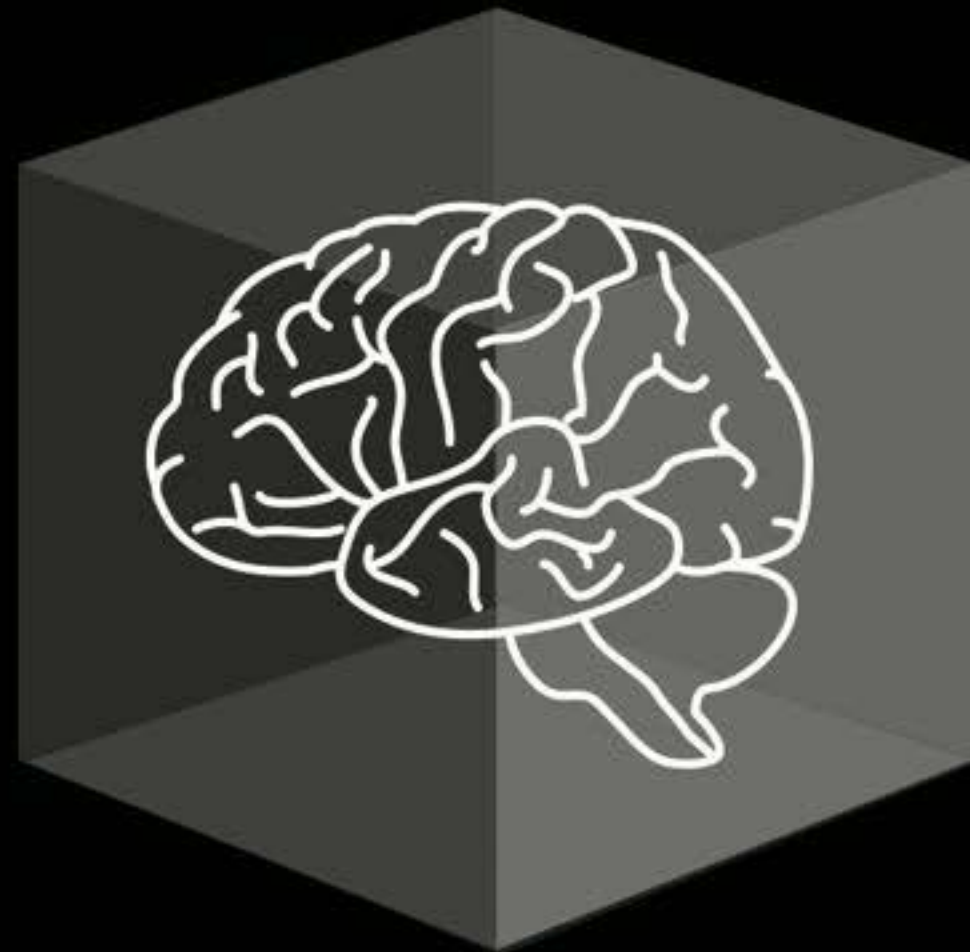




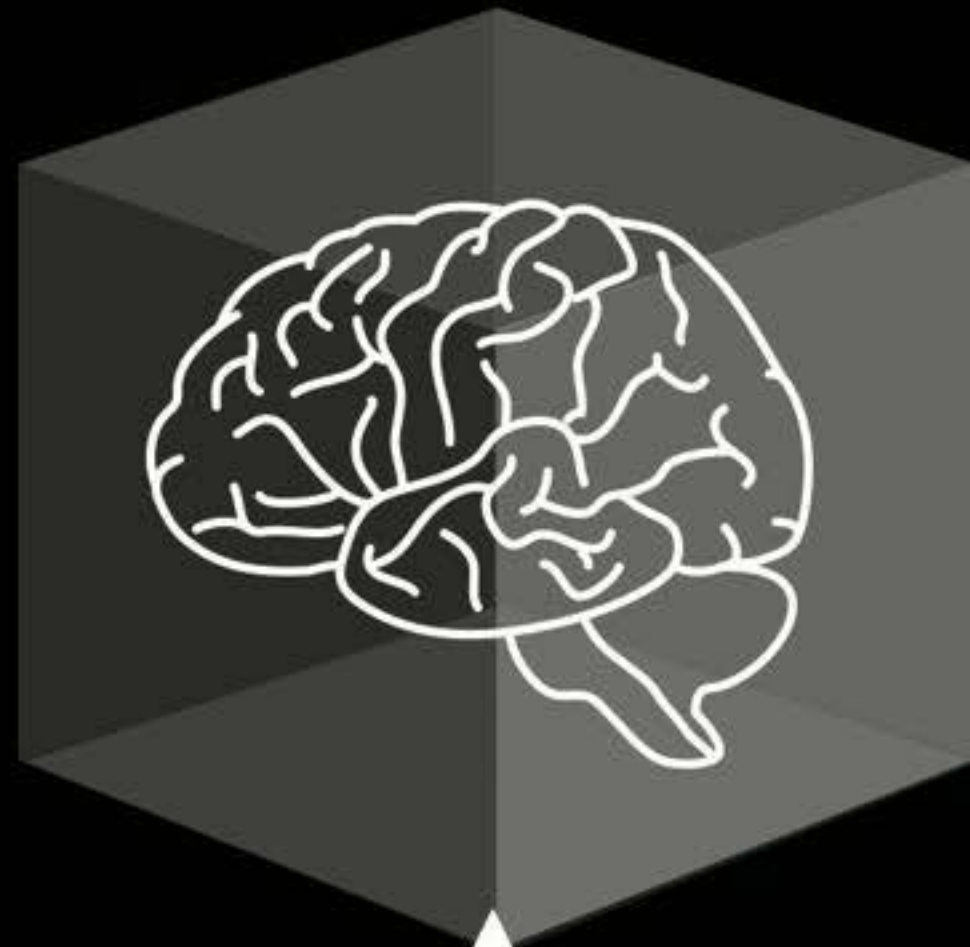




Air Pressure
Light
Chemicals



Air Pressure
Light
Chemicals



Aches
Shivers
Tightness



REVERSE INFERENCE PROBLEM

Air Pressure
Light
Chemicals

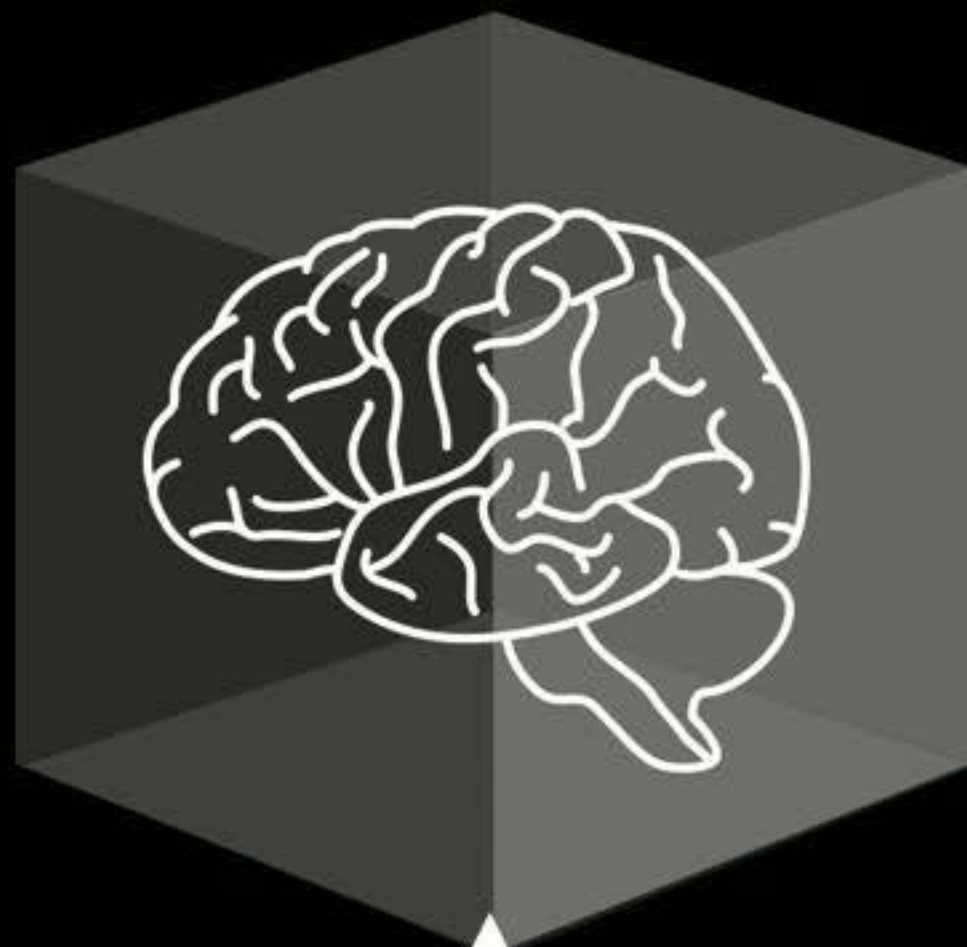


Aches
Shivers
Tightness



REVERSE INFERENCE PROBLEM

Air Pressure
Light
Chemicals



**PAST
EXPERIENCES**



Aches
Shivers
Tightness

REVERSE INFERENCE PROBLEM

Air Pressure
Light
Chemicals

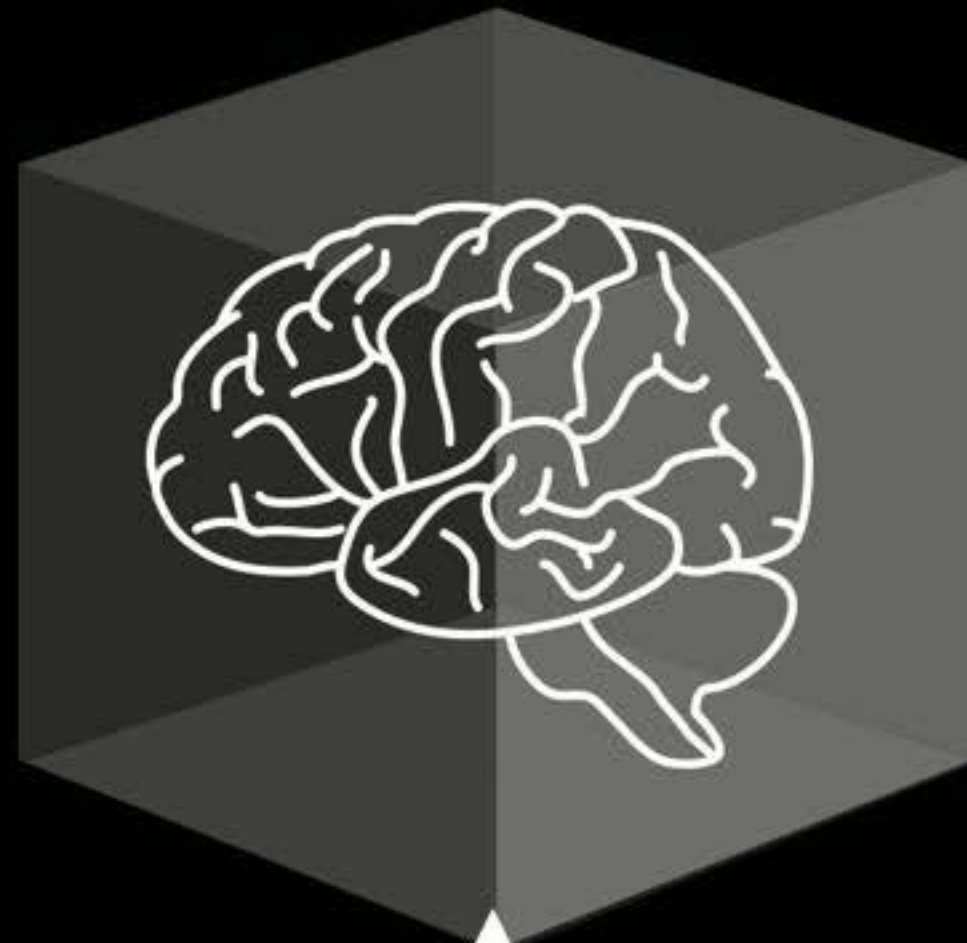


**PAST
EXPERIENCES**

Aches
Shivers
Tightness

REVERSE INFERENCE PROBLEM

Air Pressure
Light
Chemicals



Aches
Shivers
Tightness



CATEGORIES



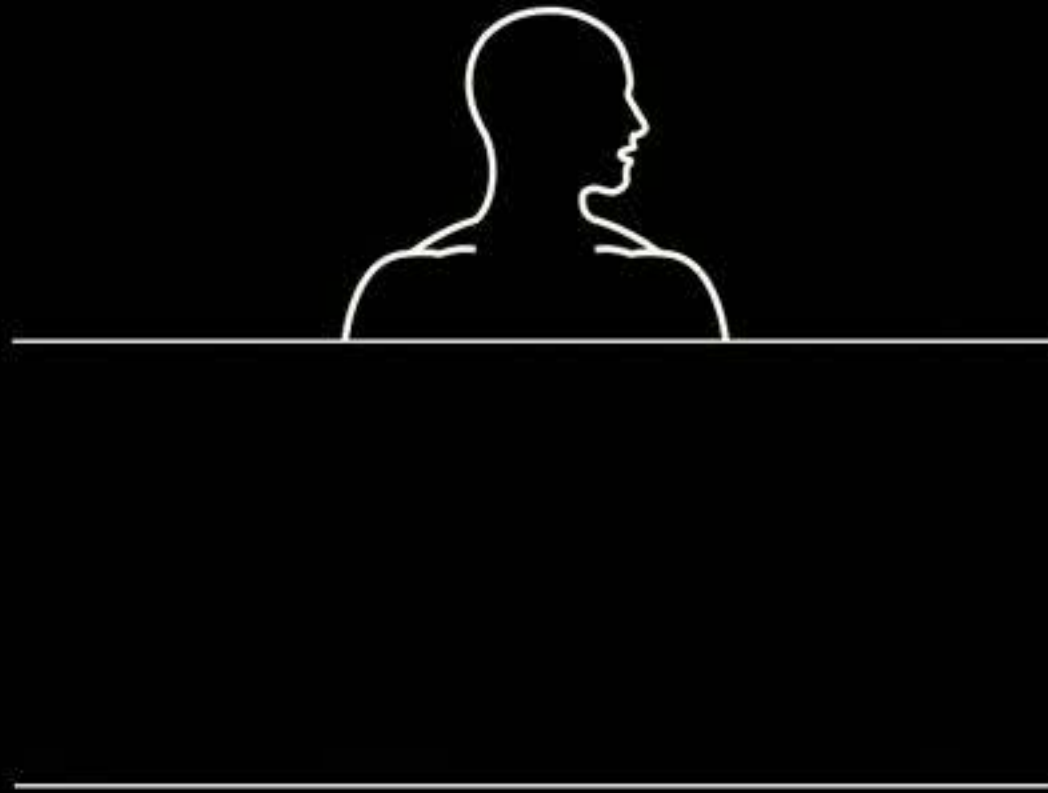
Emotions are not reactions to the world.
They are constructions of the world.



Emotions are not reactions to the world.
They are constructions of the world.



Emotions are not reactions to the world.
They are constructions of the world.





Emotions that seem to happen to you

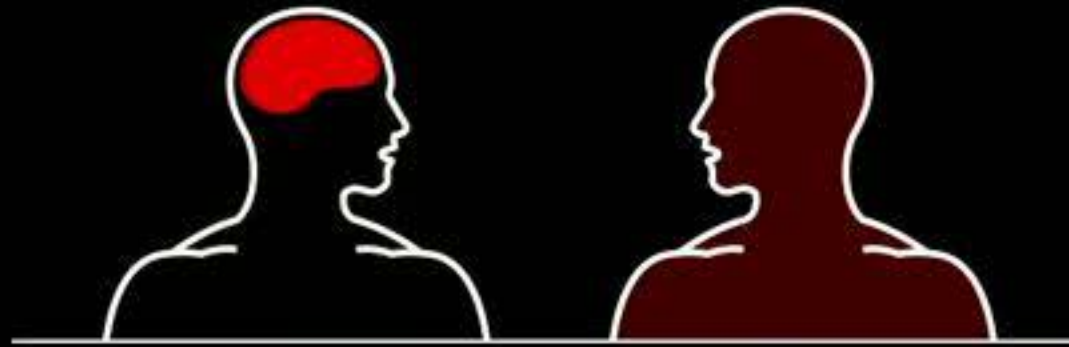


Emotions that seem to happen to you
are made by you.





The emotions you seem to detect in other people



The emotions you seem to detect in other people
are partly inside your own head.

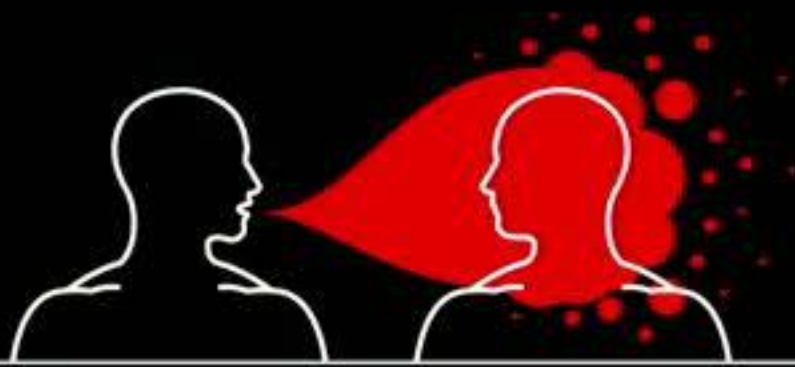
RECAP



**More than
stereotypes**



**Include
context**



Context includes the reactions of other people. Humans are social animals.



Context includes the reactions of other people. Humans are social animals.



Context includes the reactions of other people. Humans are social animals.

