Dawn of the Selfie Era

Meeyoung Cha KAIST & Facebook

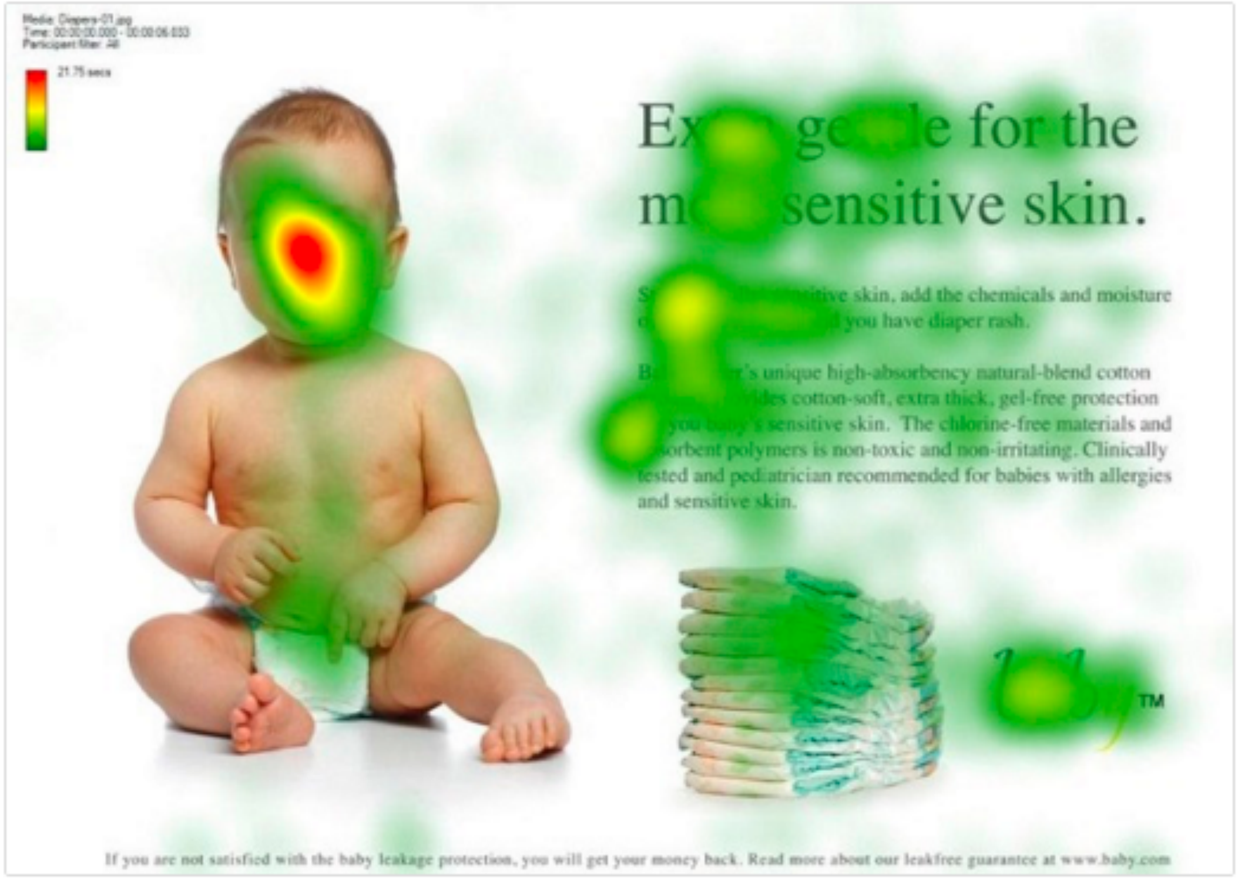
Background

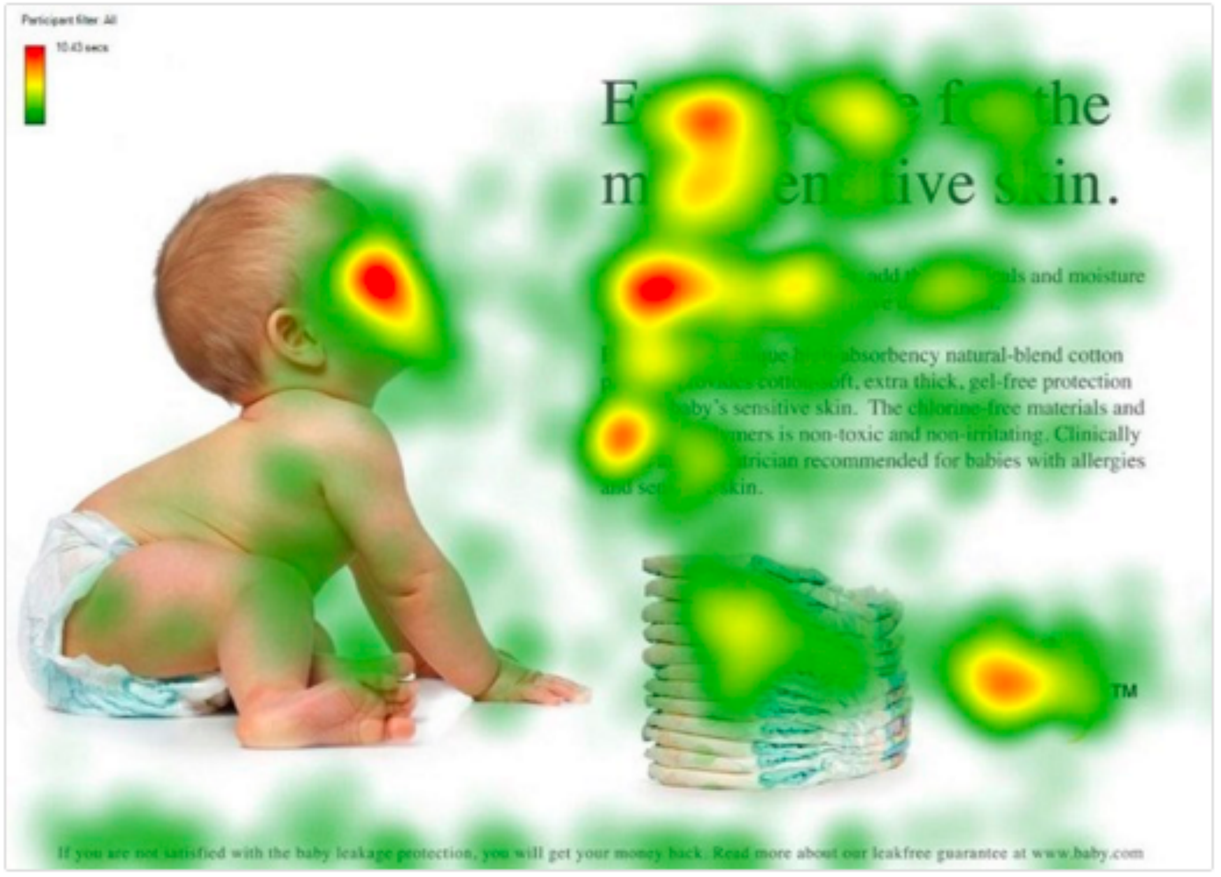
Data Methodology

Hypothesis Testing

Faces engage us

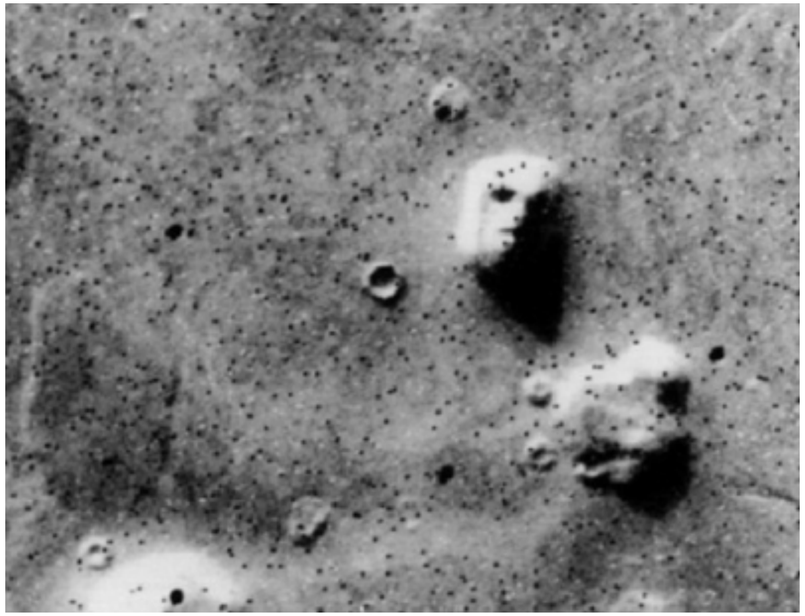
- Human faces are effective visual cues, and they even guide our gaze
  [Galfano et al., Eye gaze cannot be ignored, Q J Exp Psychol 2012]





Face perception is hardwired

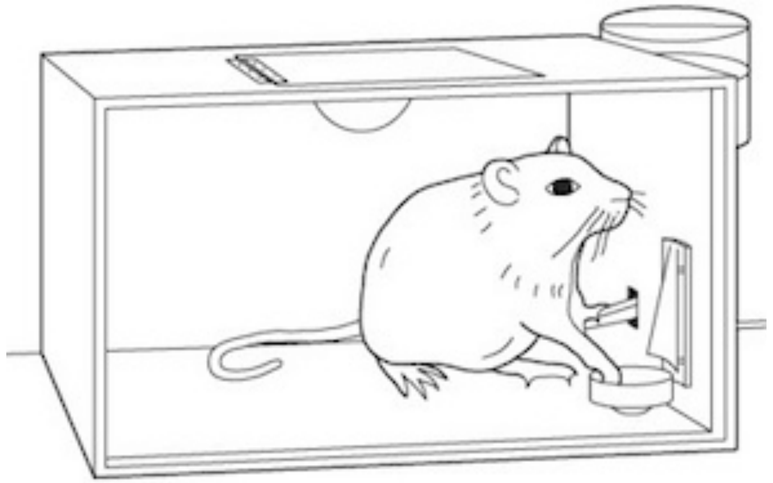
- Our left brain ranks images on a scale of how face-like they are, before right side makes the categorical distinction whether or not it's a face
  [Nakato et al., NeuroImage 2011]

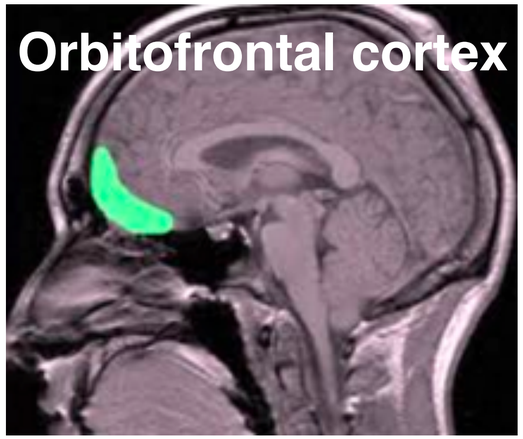


http://tinyurl.com/hrkzcfx

Faces reward us

- Attractive faces light up the brain's dopamine-driven reward system, so that one would press a key to see an attractive face for longer
  [C. Wald, The aesthetic brain, Nature 2015]
- The desire to see faces longer is related to "wanting" more than "liking"
  [Aharon et al., Beautiful faces have variable reward value, Neuron 2001]





What is an attractive face?

Egypt, Nefertiti 1345 BC

"The bust of Nefertiti has become one of the most admired, and most copied, images from ancient Egypt. It is seen as an icon of international beauty. Showing a woman with a long neck, elegantly arched brows, high cheekbones, a slender nose and an enigmatic smile played about red lips, the bust has established Nefertiti as one of the most beautiful faces of antiquity."

- The Ideal Woman Through the Ages, Discovery 2012

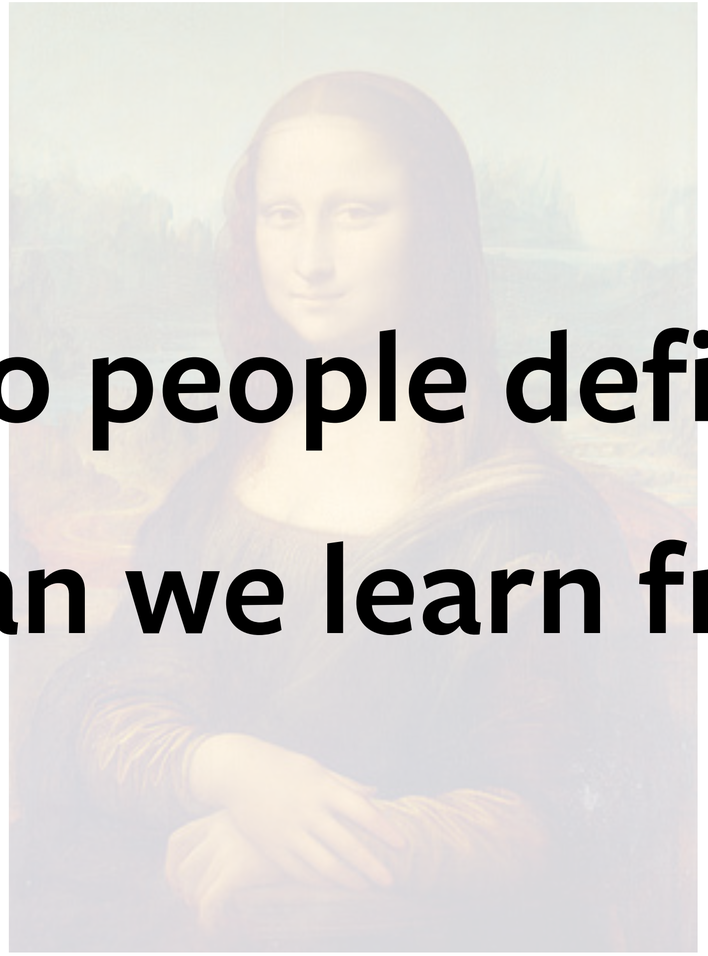
Beauty across cultures

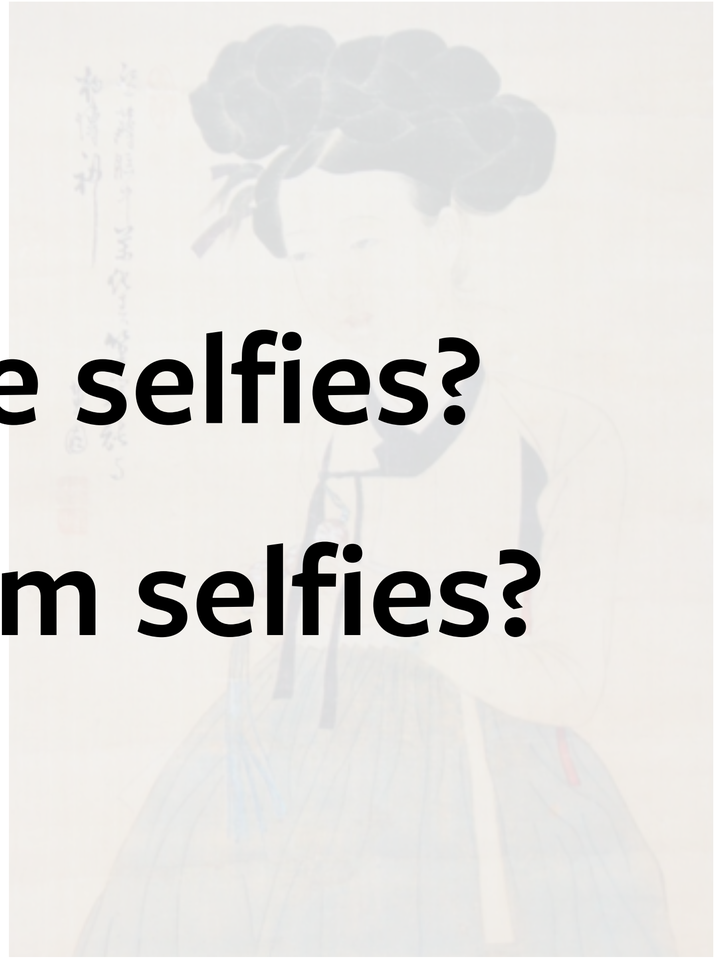
Egypt, Nefertiti 1345 BC

Italy, Mona Lisa 1503

Joseon dynasty 1758 신윤복

The era of selfies





How do people define selfies?

What can we learn from selfies?

Face detection tools

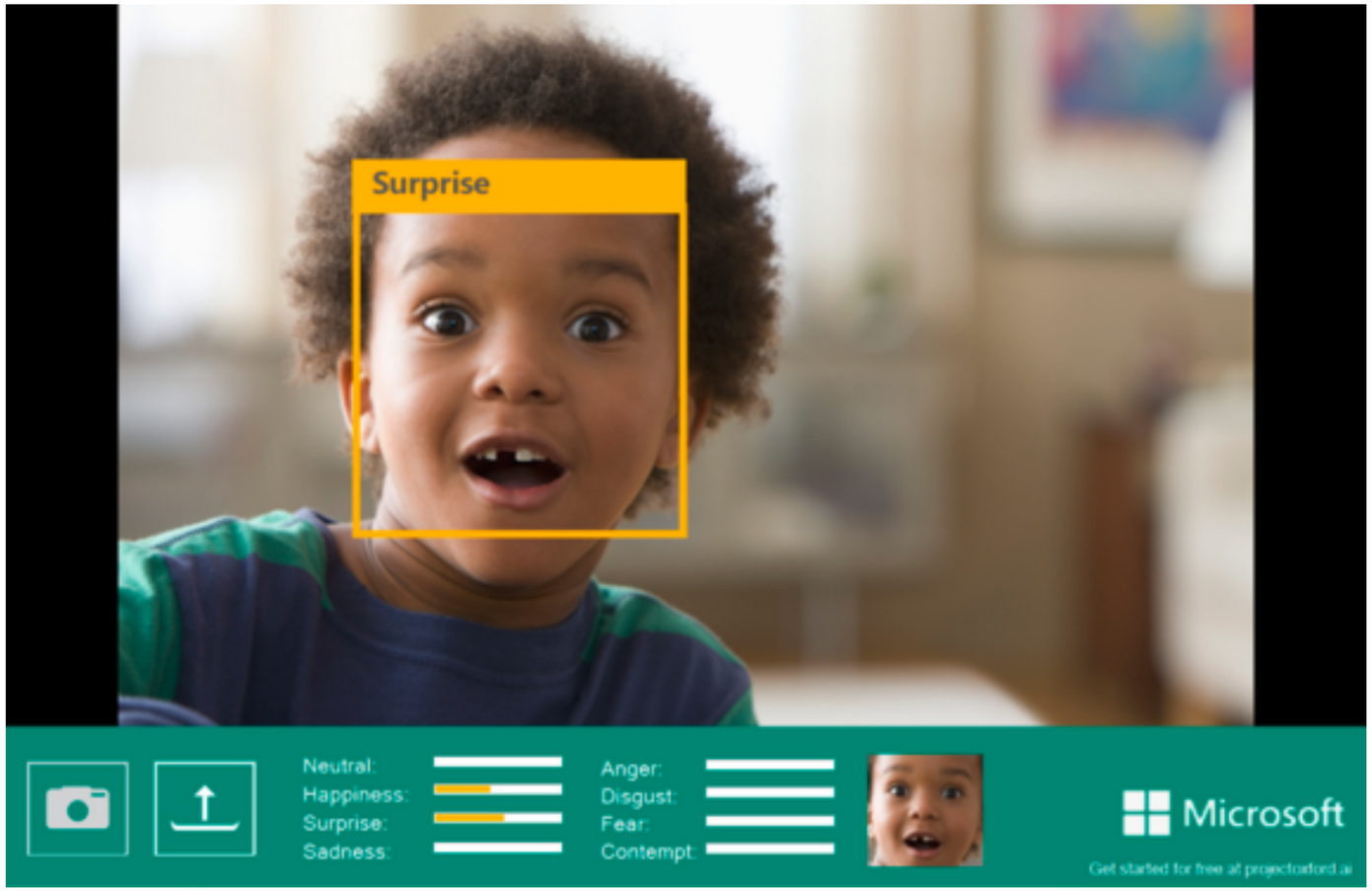
- Technology enables a massive-scale analysis

  Face++ 2013-

  Microsoft Emotion API 2015-

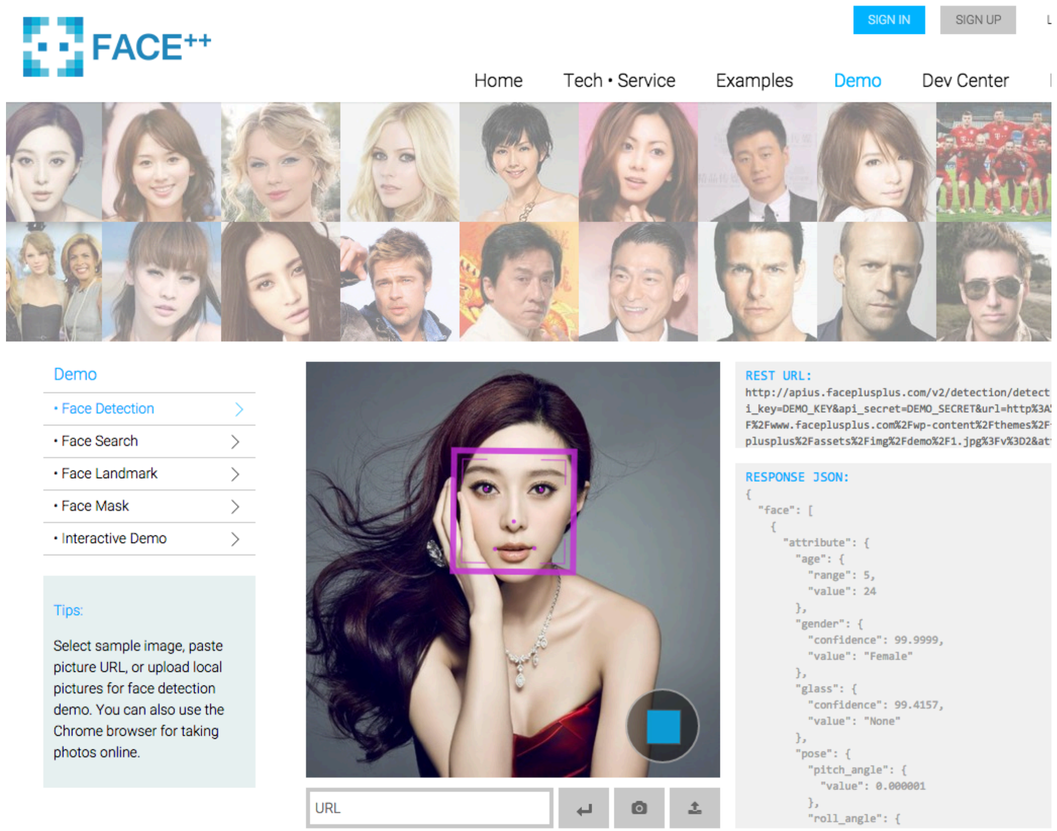
  Google Cloud Vision 2015-

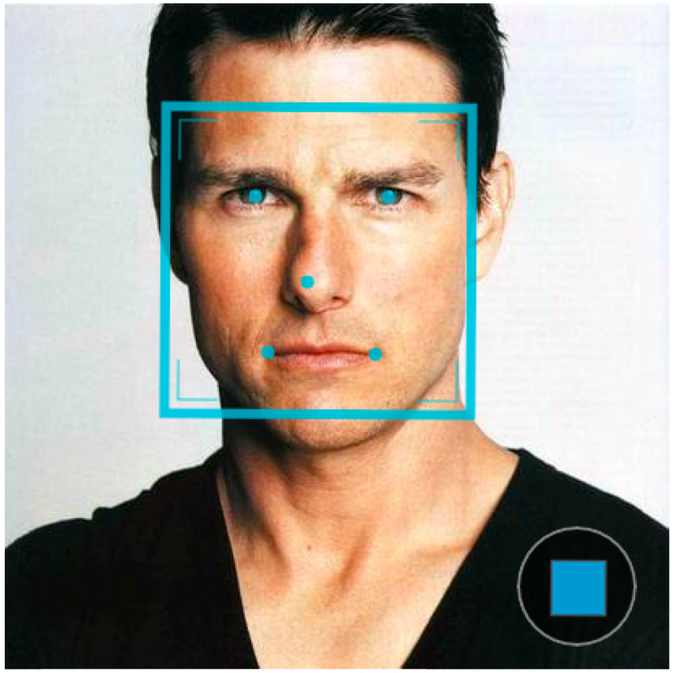
  Apple Emotient 2016-



Facial features

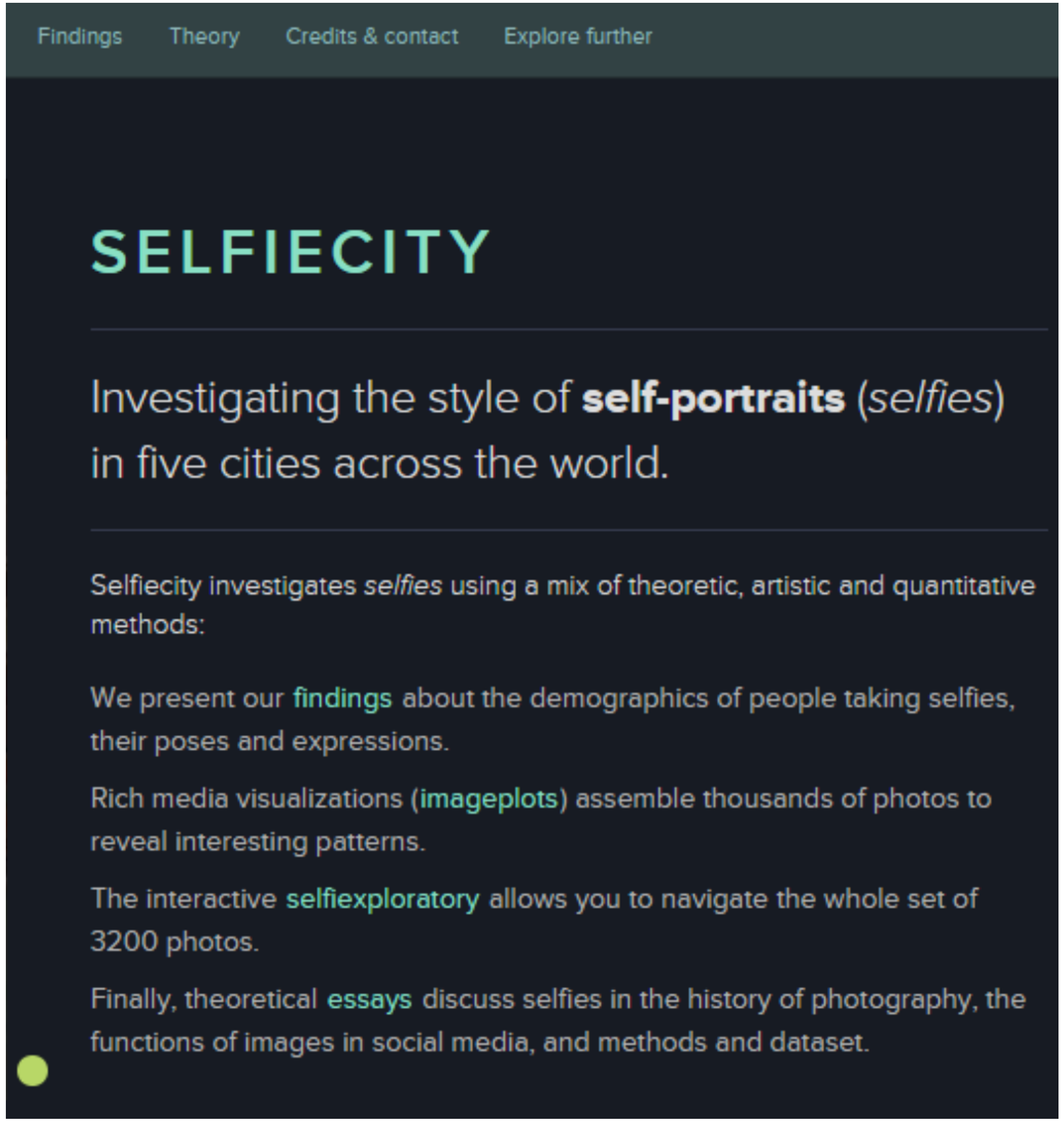
- Visual features are analyzed to predict age, gender, and smile score

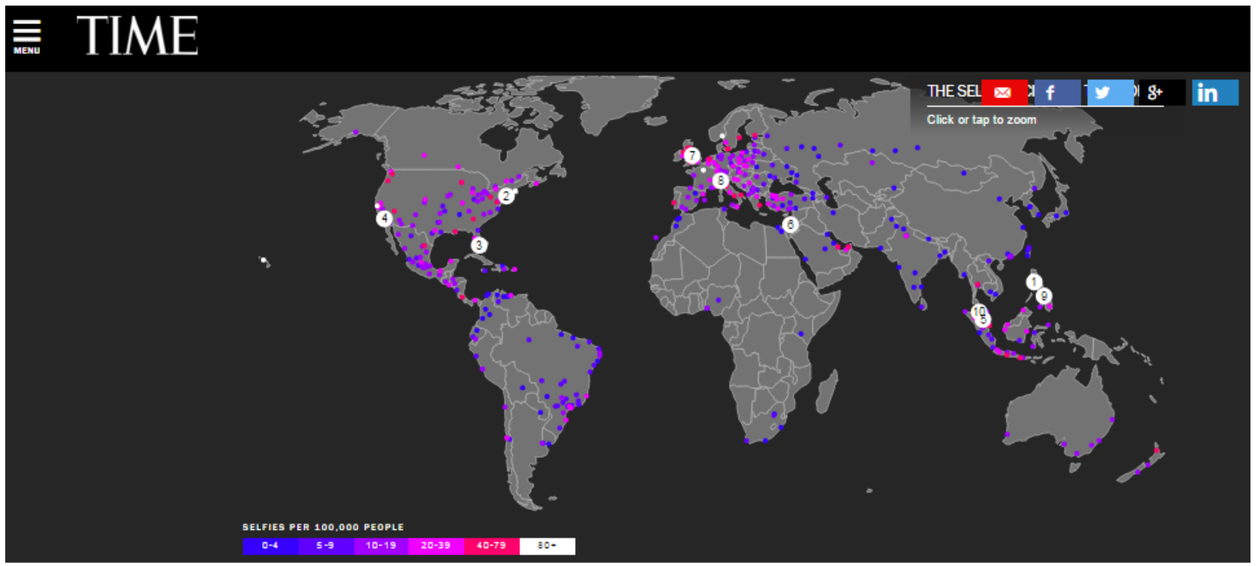




Age	**22 (±5)**
Race	**White (99.98%)**
Gender	**Male (99.64%)**
Glass	**None (99.98%)**
Smiling	**1.36%**

Inspired by awesome visualizations





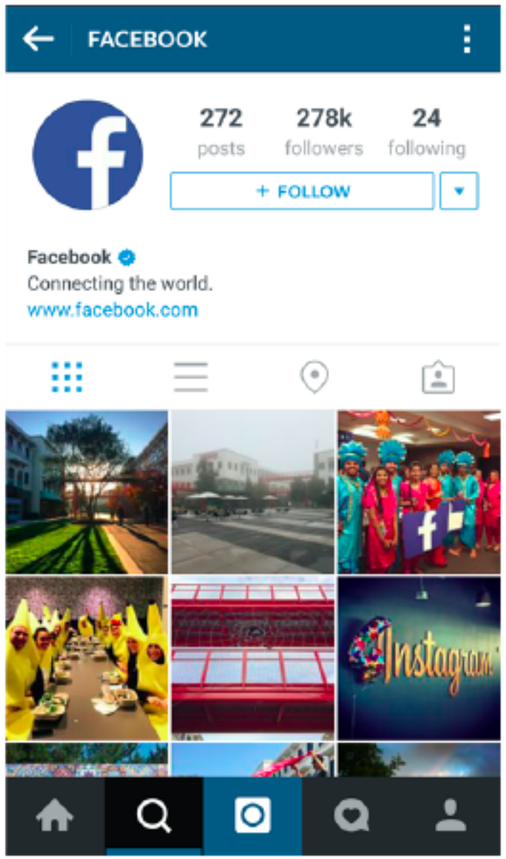
Background

Data Methodology

Hypothesis Testing

Data collection

- Randomly sampled 1% of user IDs and gathered information about **profiles** and **feeds** of public users between **2011-12** to **2014-12**



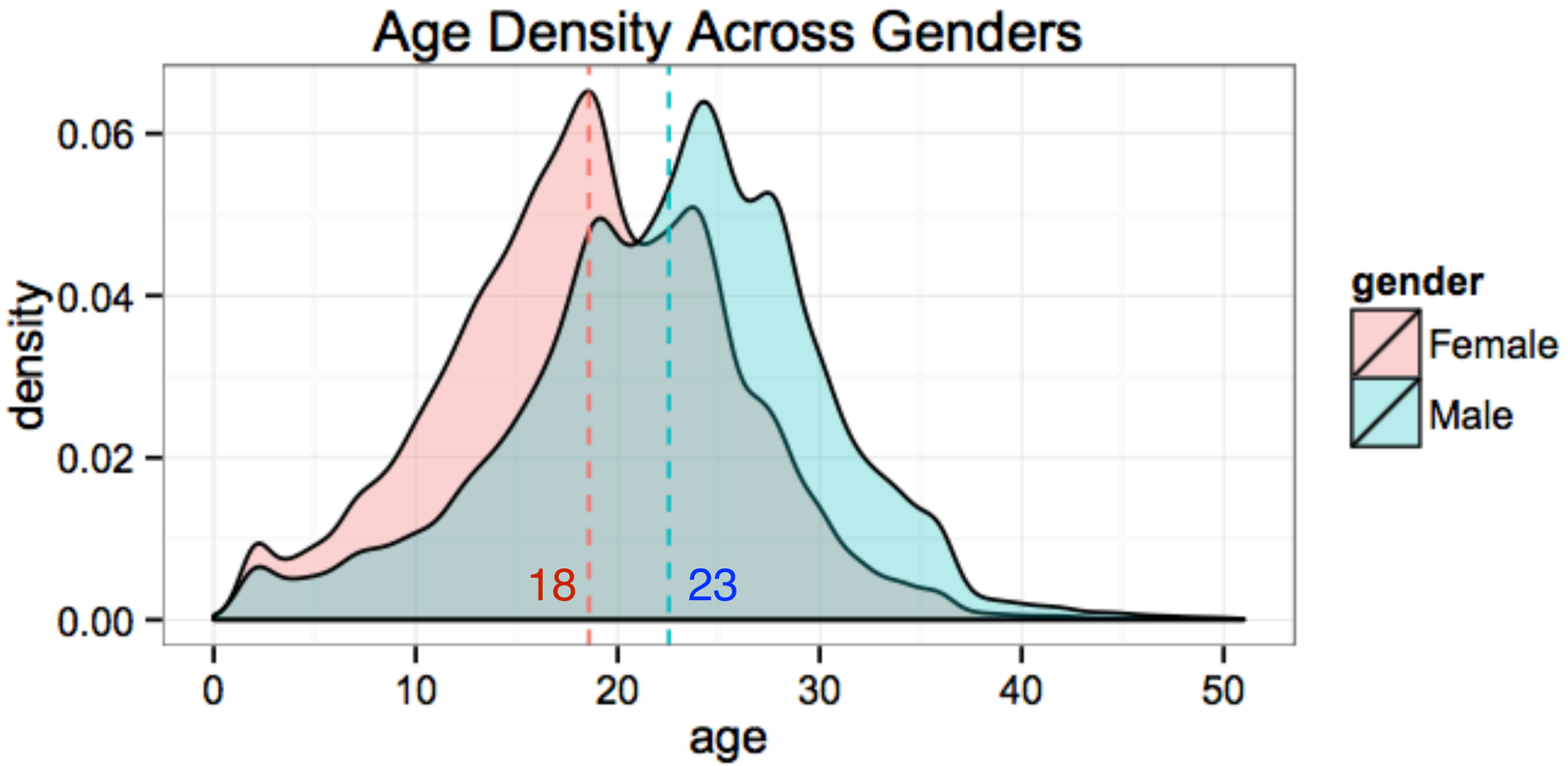
(a) Profile

(b) Feed

Scale of data

Age distribution

- 53% of Instagram users are 18-29 years old



How are selfies defined?

- For comparison, extracted 4 kinds of data each spanning 3 years

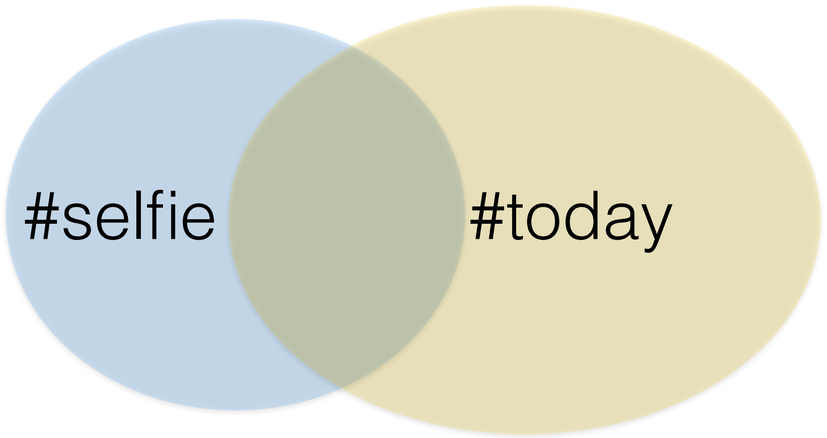
• Pics with hashtags containing ‘selfie’ (~**1M**)	Selfie
• Pics with alternative hashtags (~**2.5M**)	Alt
• Pics with at least one face (~**2M**)	Face
• Randomly chosen set of pictures (**10M**)	All

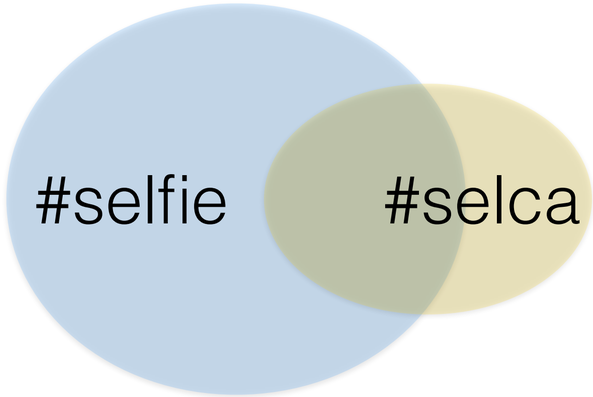
Finding alternative hashtags

- How much more do two hashtags co-occur than if they were independent? Use pointwise mutual information (PMI) to measure word association

  Found 81 variants like #selca, #selstagram, #gaybeard, #butfirst, #özçekim (selfie in Turkish)

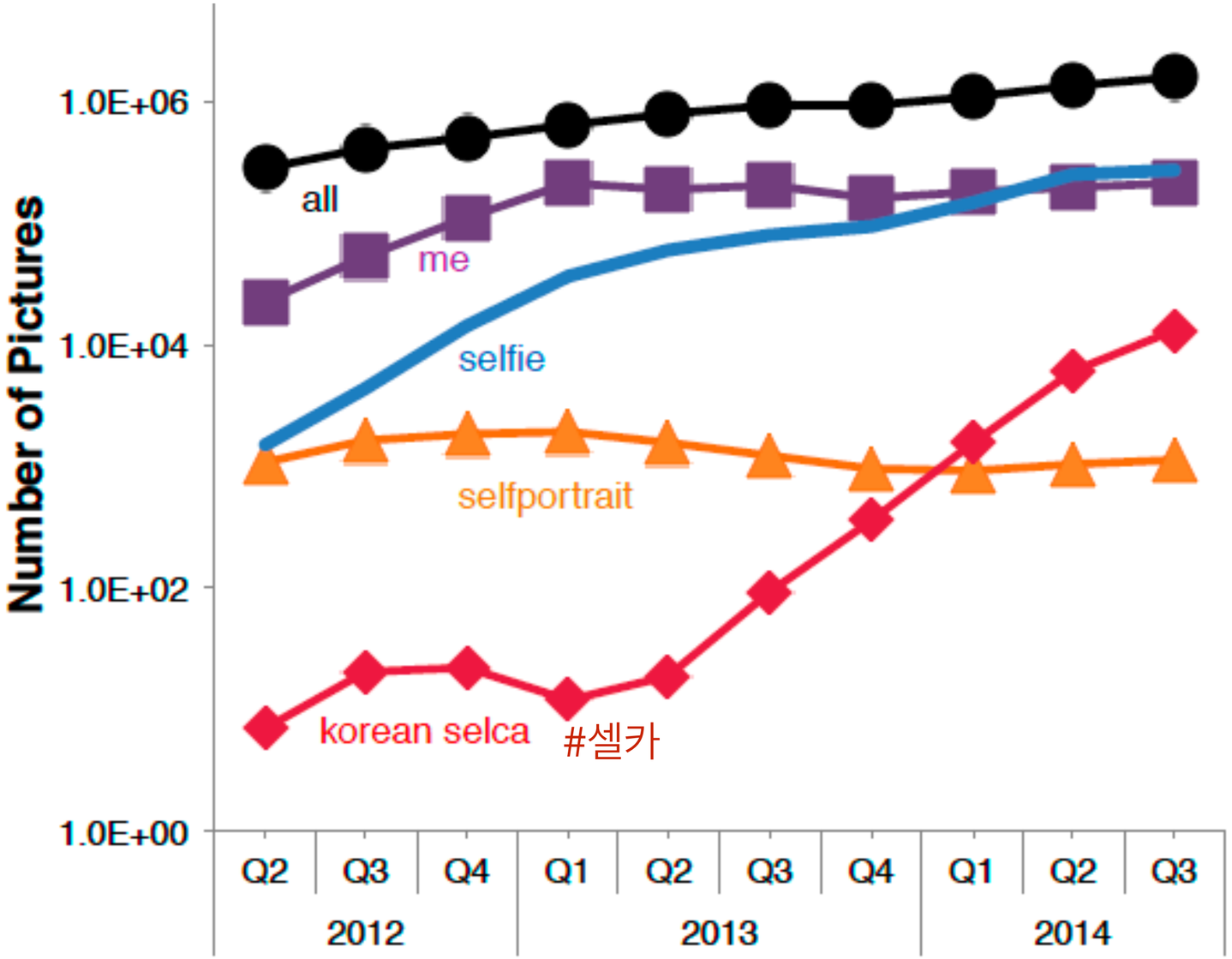
$$\mathrm{PMI}(x, y) = \log \frac{p(x, y)}{p(x)p(y)}$$





Trajectory of hashtags

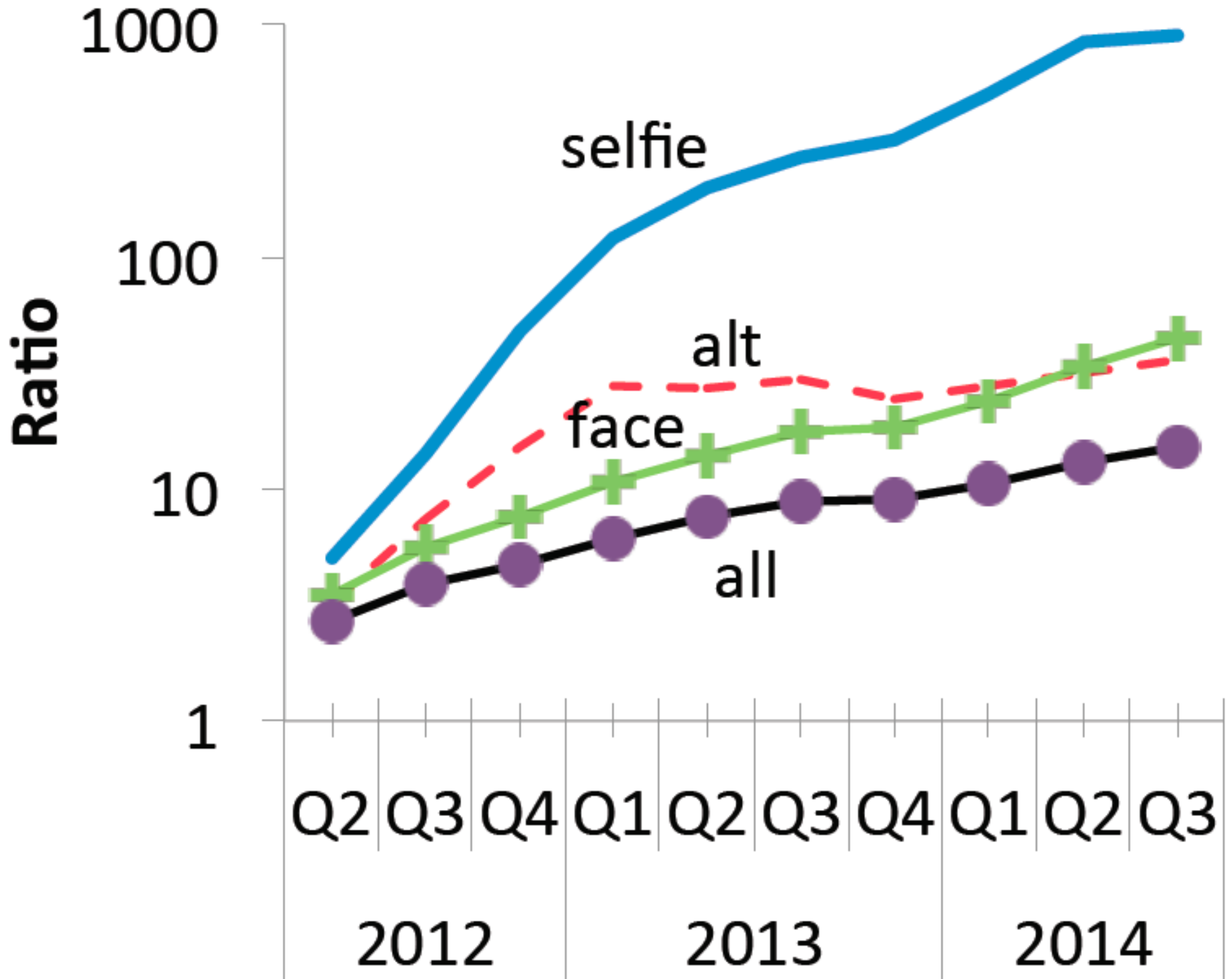
- #selfie grew rapidly
- #me grew at a slower rate
- #selfportrait is steadily used
- culture-specific spikes



How did selfies become so popular?

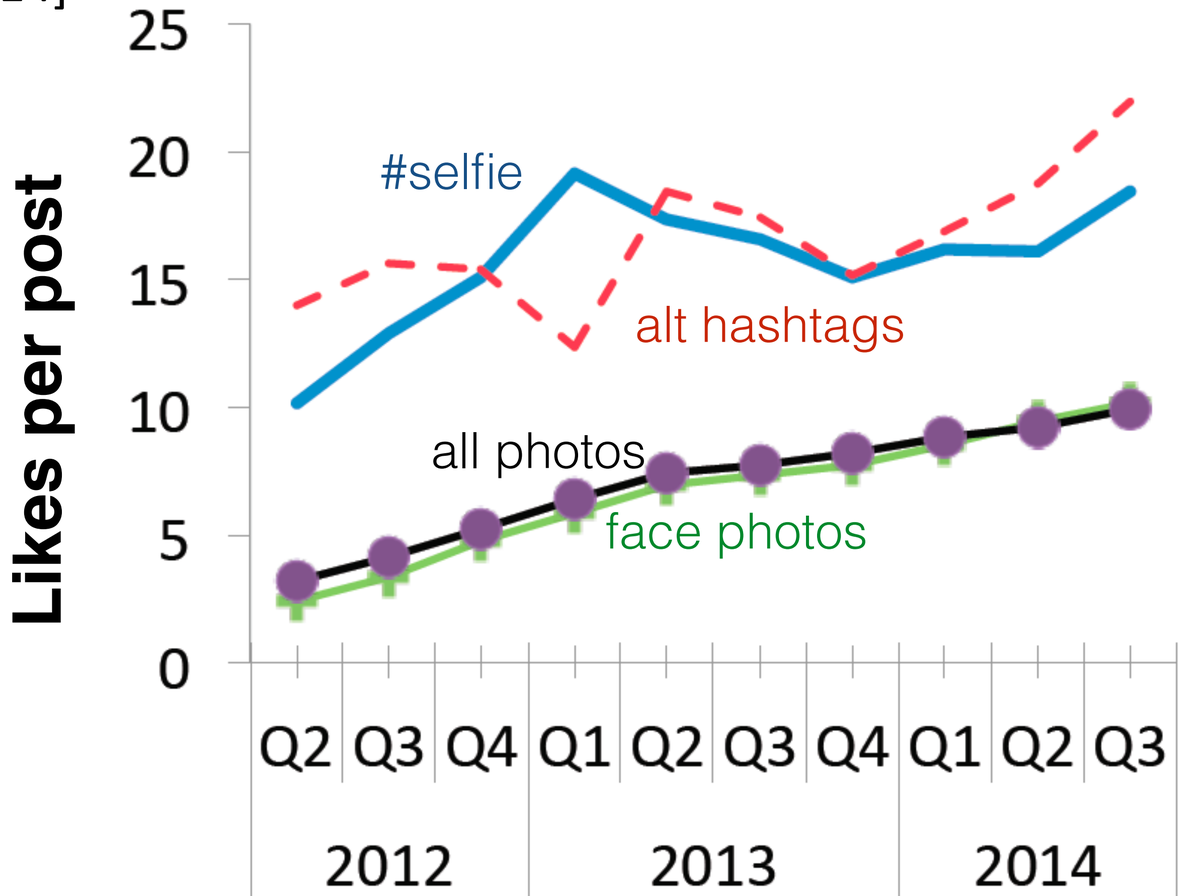
Rapid growth

- From 2012 to 2014, Instagram grew 15x and **#selfie grew 900t times**



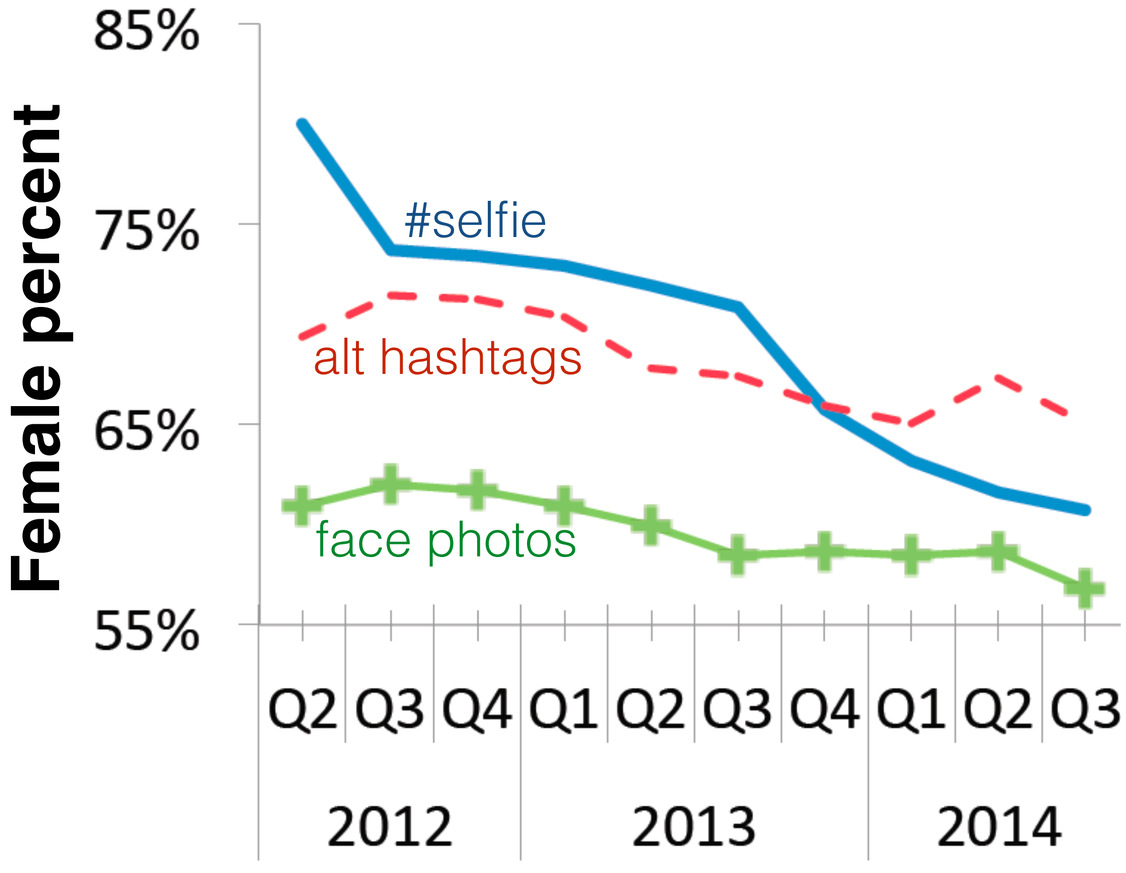
Selfies engage us better

- Selfies receive more likes and comments than other kinds of photos
- Photos with faces attract 1.38x likes and 1.32x comments on Instagram
  [Bakhshi et al., ACM CHI 2014]



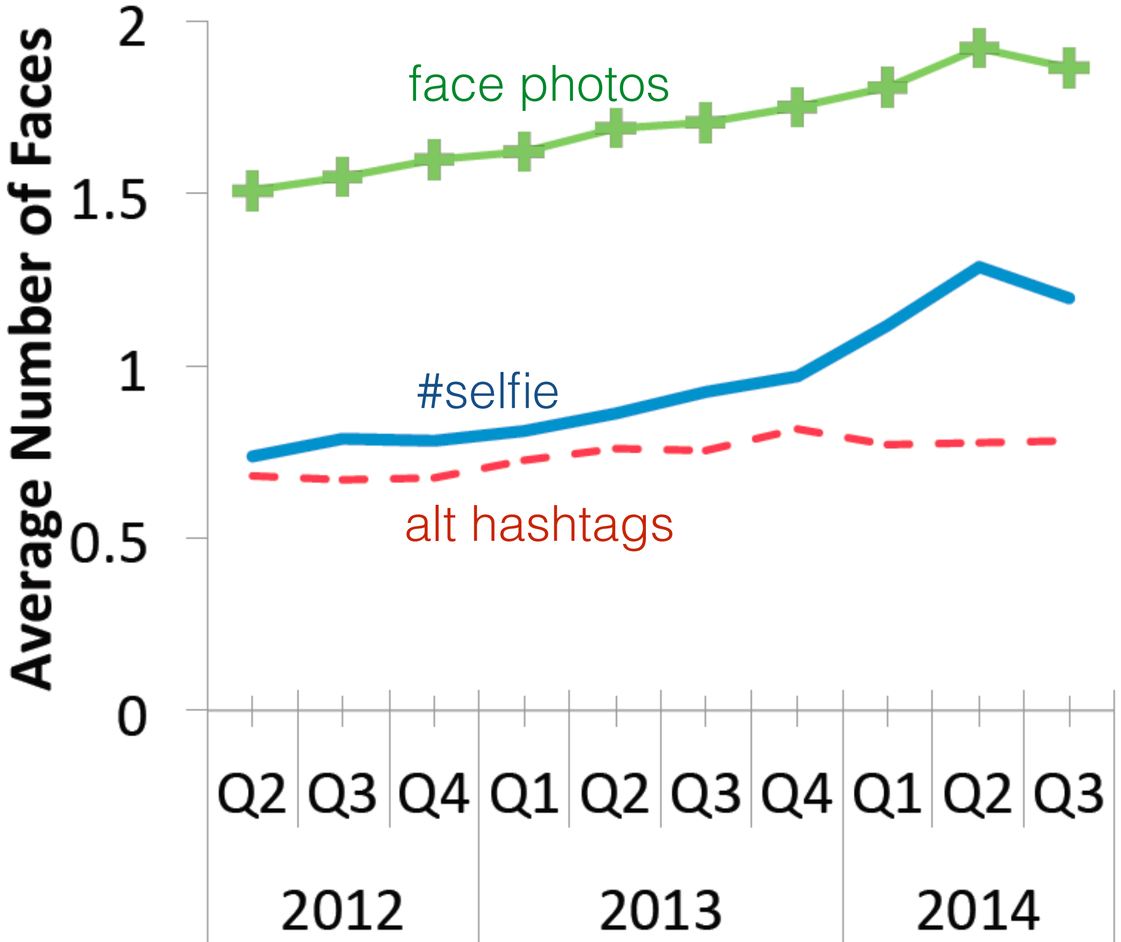
Early adopters

- Female users drove the initial momentum for #selfie hashtags, but over 3 years it is being used more equally by males and females

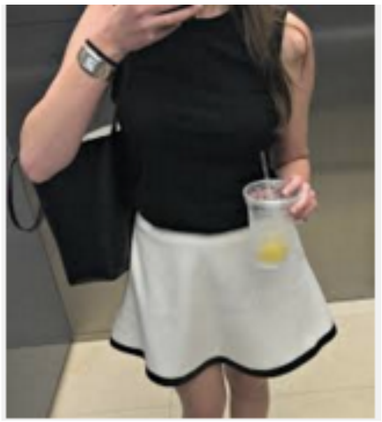


Face counts

- Most #selfie photos contained a single face and sometimes none

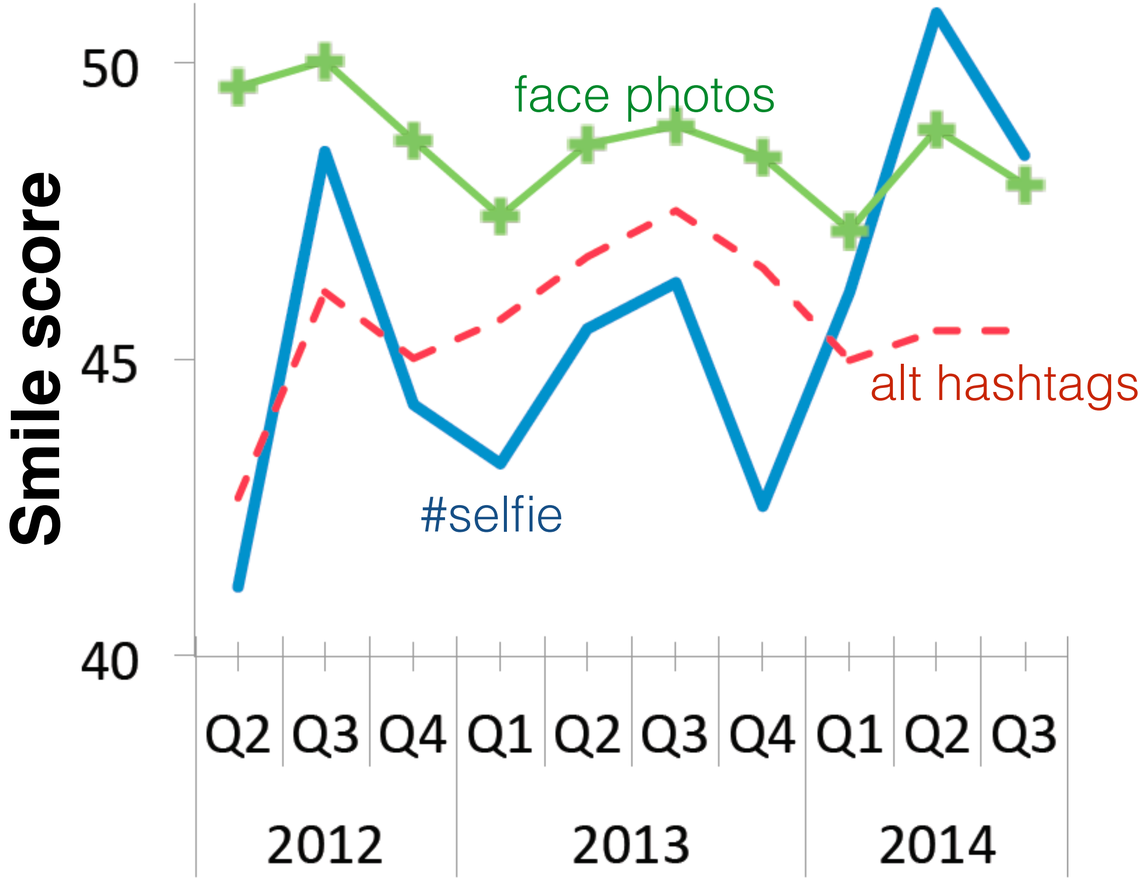


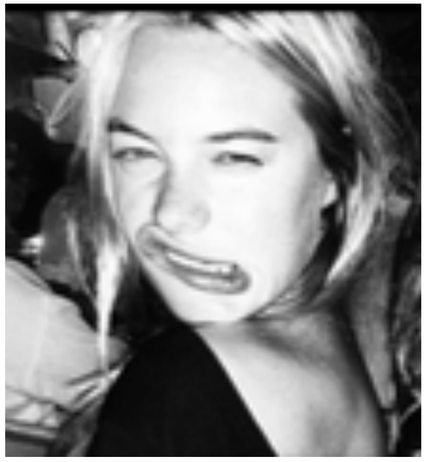
No face #selfie



Smiles

- #selfie photos are not smiling more than regular face photos

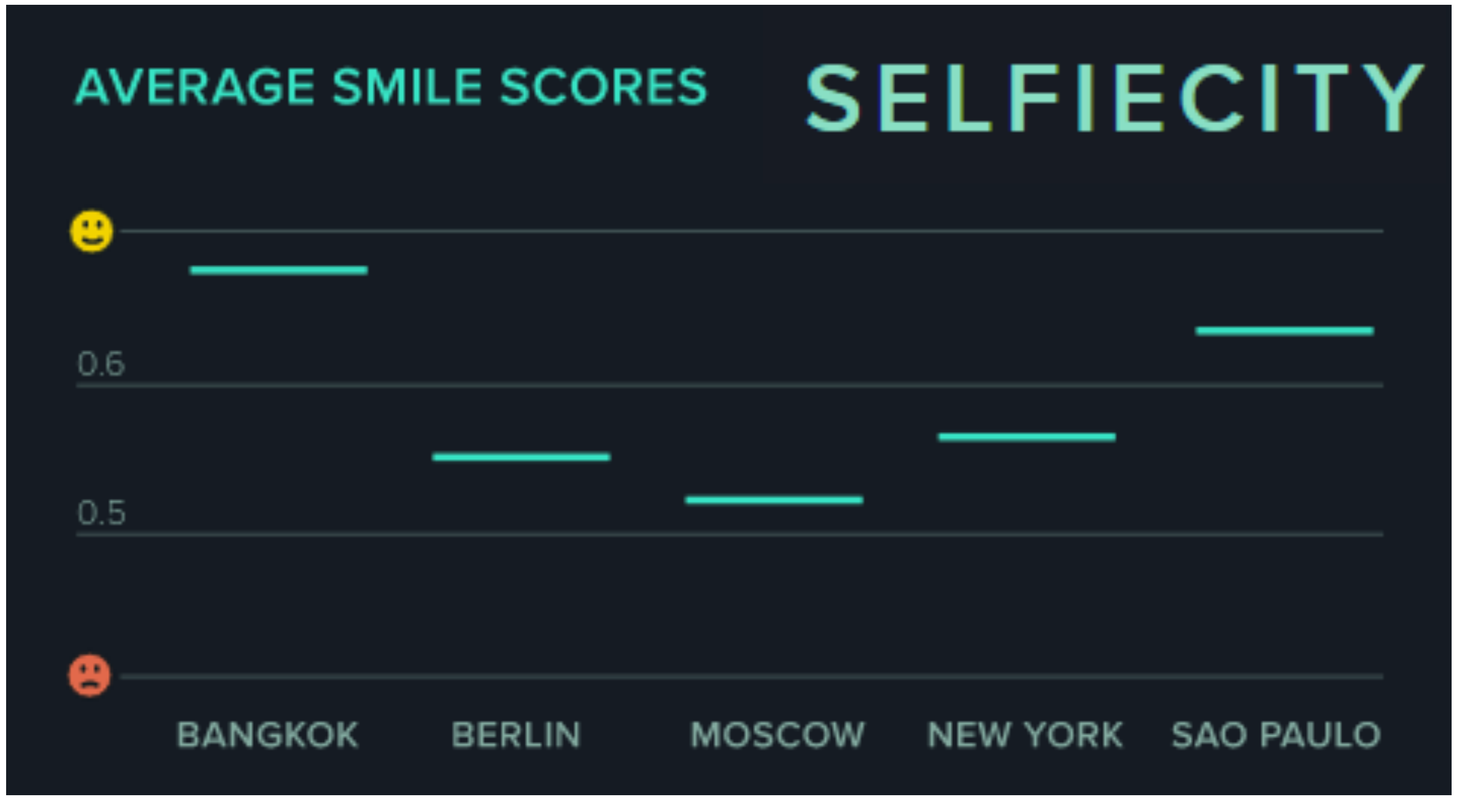




It's not cool to smile?

What's in a smile?

- In some cultures, smiling in public may seem awkward or even silly



http://selfiecity.net/

Background

Data Methodology

Hypothesis Testing

How does culture affect selfies?

Tested three hypotheses

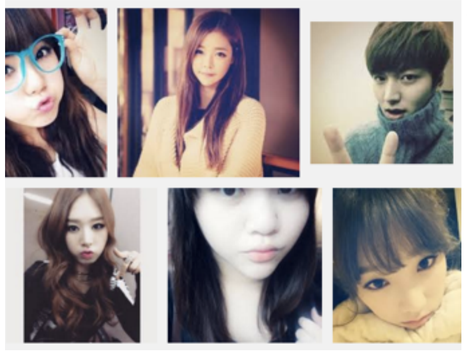
- **H1 Gender empowerment**
  Women in countries with higher gender equality are more comfortable in sharing selfies publicly than in less equal countries

- **H2 Membership**
  Selfies are more prevalent where citizens feel a strong tie with their local community or with a global connected community

- **H3 Privacy**
  Countries where people are aversive to uncertainty will post comparatively fewer selfies

H1 Gender empowerment 1

- Would differentiation in gender roles within a country be reflected in the proportion of women or men taking selfies?
- A higher fraction of males used #selfie in Nigeria and Egypt



Top 5			Bottom 5		
Country	M.age	F.prev	Country	M.age	F.prev
KOR	16.9	0.71	NGA	23.5	0.31
KAZ	19.3	0.68	EGY	22.7	0.28
PHL	17.9	0.68	SAU	20.4	0.28
CHN	16.6	0.67	KWT	22.0	0.28
UKR	20.9	0.66	IND	23.9	0.20

H1 Gender empowerment 2

- (IDV1) Gender Gap Index by the World Economic Forum, N=111
  How much the gap has closed for health, education, economy, and politics (high value=equal society)

  (IDV2) Patriarchal Value Index by the World Value Survey, N=54
  To what extent do you agree with values tied to stereo-typical gender roles (low value=equal society)

- (DV) Gender Bias Index from data
  Percent females normalized by census

$$GenderBias = \mathrm{P}_{\mathrm{selfies}} - \mathrm{P}_{\mathrm{census}}$$

- (CV) log GDP per capita, Internet penetration, and average age

H1 Gender empowerment 3

Hypotesis: Measure	Ind.	Selfie	Alt	Face
H_1 : GenderBias	GGI	0.34^{***}	0.41^{***}	0.32^{***}
	PV	$-0.20^{\diamond}$	-0.38^{***}	$-0.19^{\diamond}$

- Both the Gender Gap Index and the Patriarchal Value Index had an effect on the level of Gender Bias in selfies
- The more equal a society was perceived, the higher fraction of females participated in posting selfies and face photos

H2 Membership and H3 Privacy

- Selfies were linked to feelings of **belonging to a local community** (but not tied to the belongingness to the **global community**)
  Hofstede's Cultural Dimension asks "Do you see yourself as a part of the local community?"

- In terms of privacy, countries where citizens **trust strangers** and feel they are **in control** over their lives posted **fewer** selfies
  World Value Survey asks"Would you say that most people can be trusted?" and "How much freedom of choice and control do you feel you have over the way your life turns out?"

Conclusion

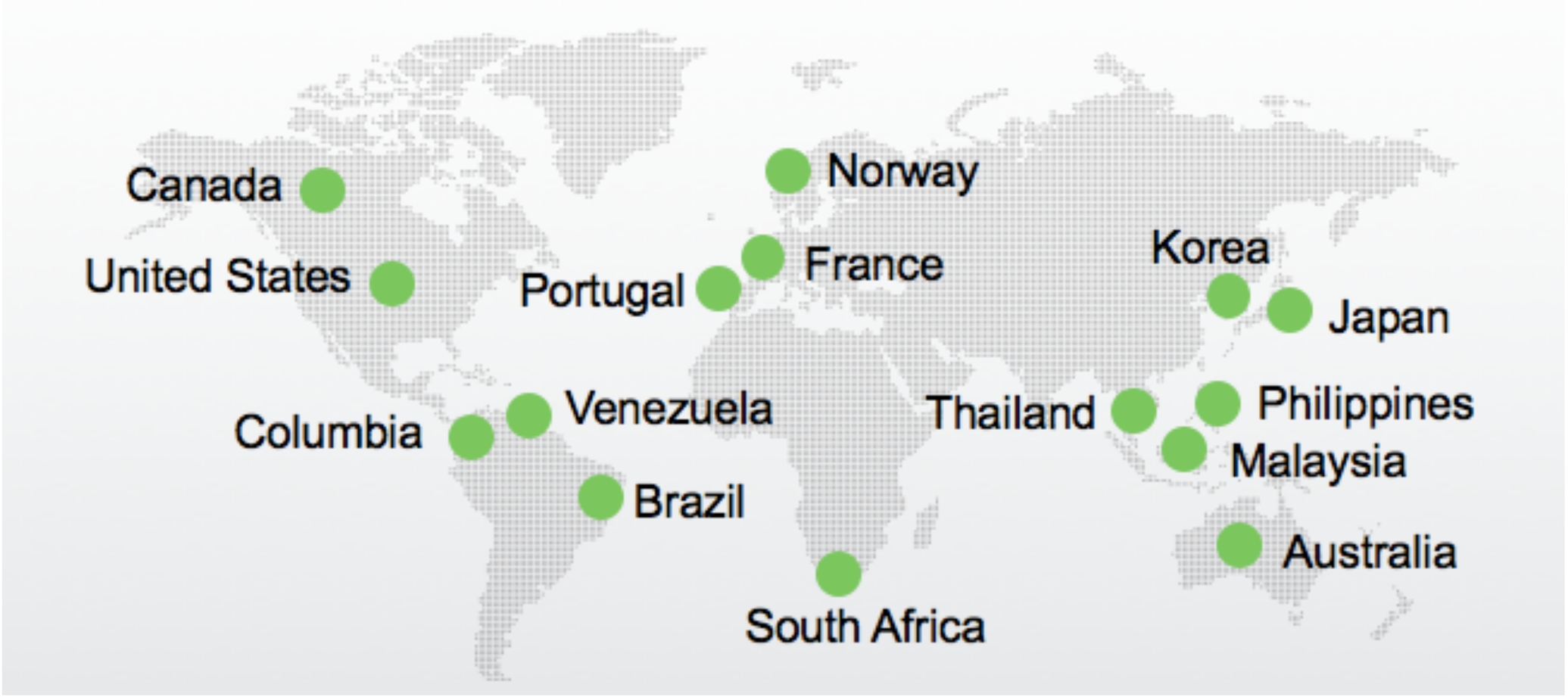
Implications

- Selfies have become a successful social convention and are a new window to study collective user behaviors

- Selfies (1) are ubiquitous as seen by the wider adoption across gender, they (2) engage audience better as seen by increase in likes/comments, and (3) their behaviors are determined by various cultural traits

Country rank by smiles

- What would affect the degree of smile at the country level?



Faces in urban areas

- Facial features can be examined at 5-meter tile level

http://tinyurl.com/z2o3lho
https://code.facebook.com/

Thank you

Dawn of the Selfie Era: The Whos, Wheres, and Hows of Selfies on Instagram

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