

Massive Online Experiments

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Cognitive Science Bottleneck



Brick-and-Mortar labs

Pros

- Control over environment
- Specialized equipment
- 100 yrs institutional knowledge

Cons

- Restricted populations
- Low power
- Constrained by lab
 - Num. experimenters
 - Num. subjects that fit
 - Num. rooms, computers, etc.
 - Usually one-off, 30-60 min. intervals

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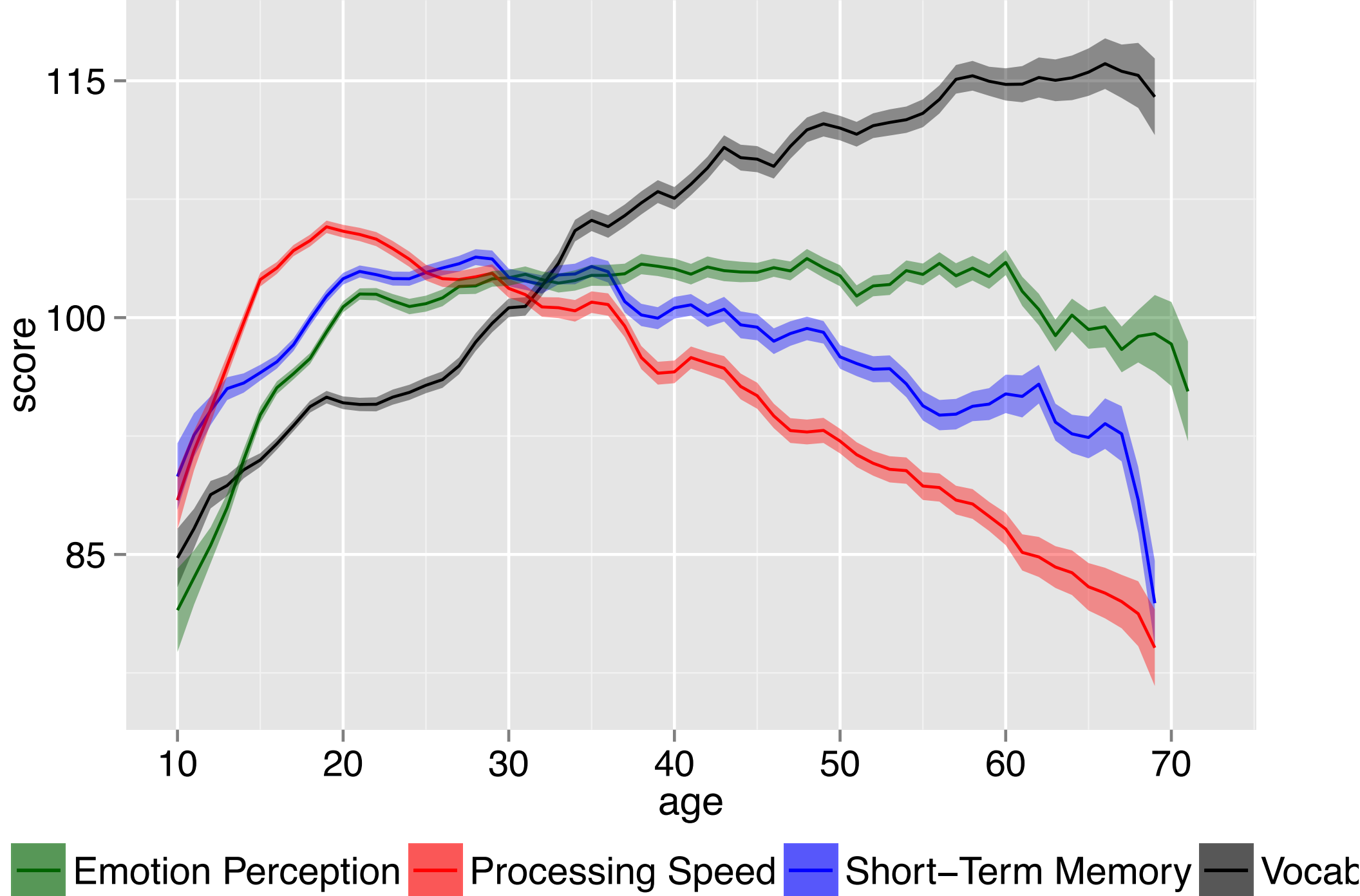
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The Dream: Massive Online Experiments

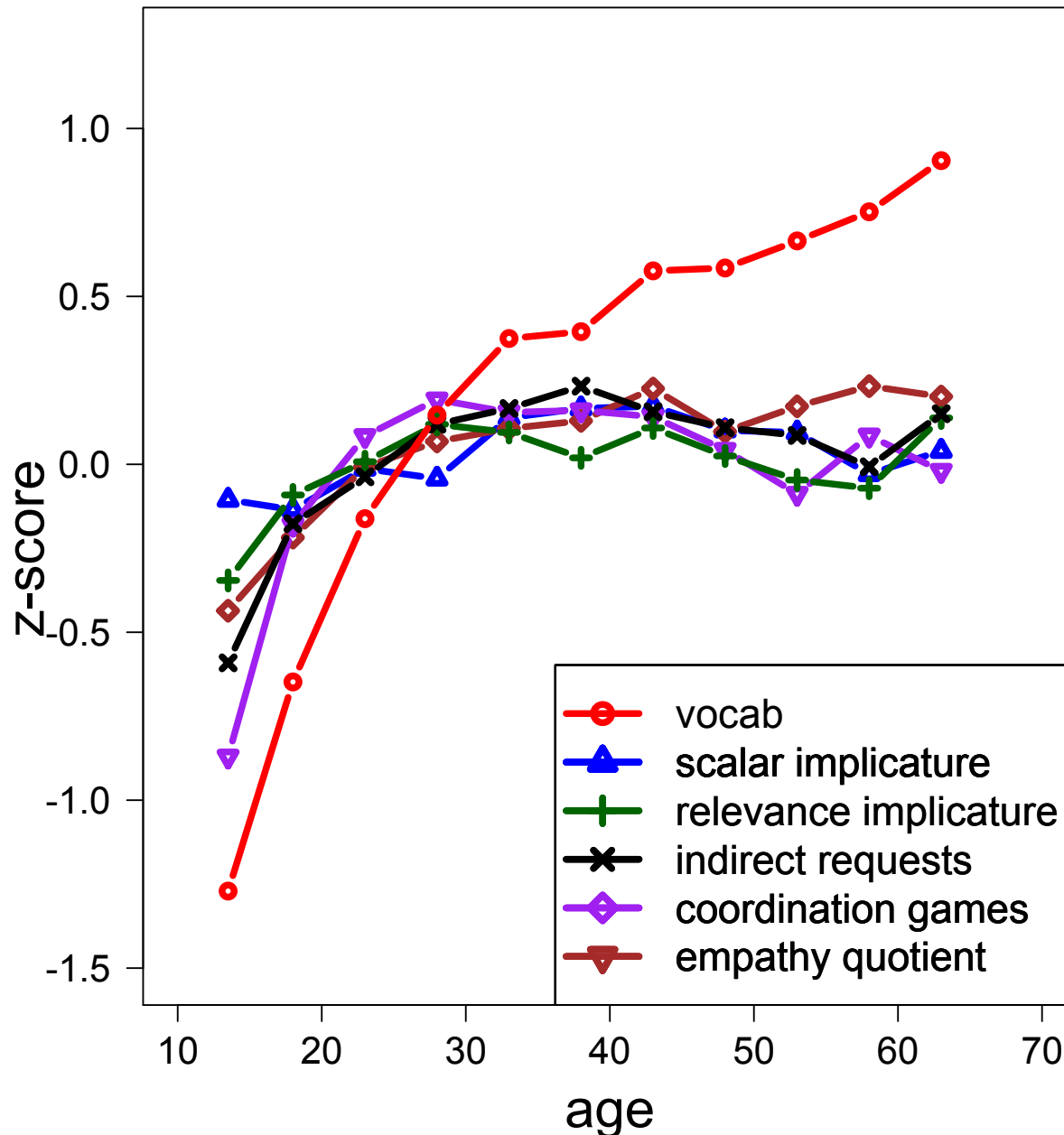
- Many subjects, world-wide
- Many items
- Many contexts/manipulations
- Longitudinal
- Social networks
- “A whole literature in one experiment”



Lifespan Development



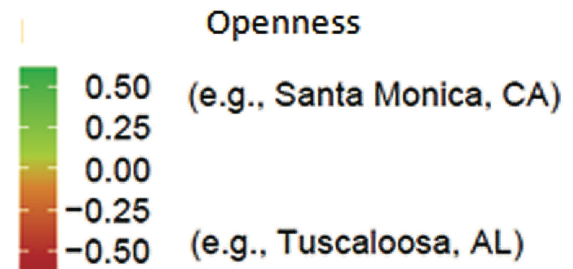
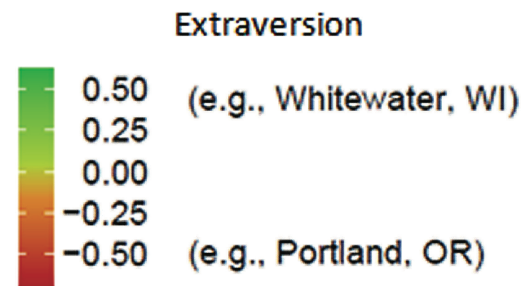
Lifespan Development



(3,224 subjects)

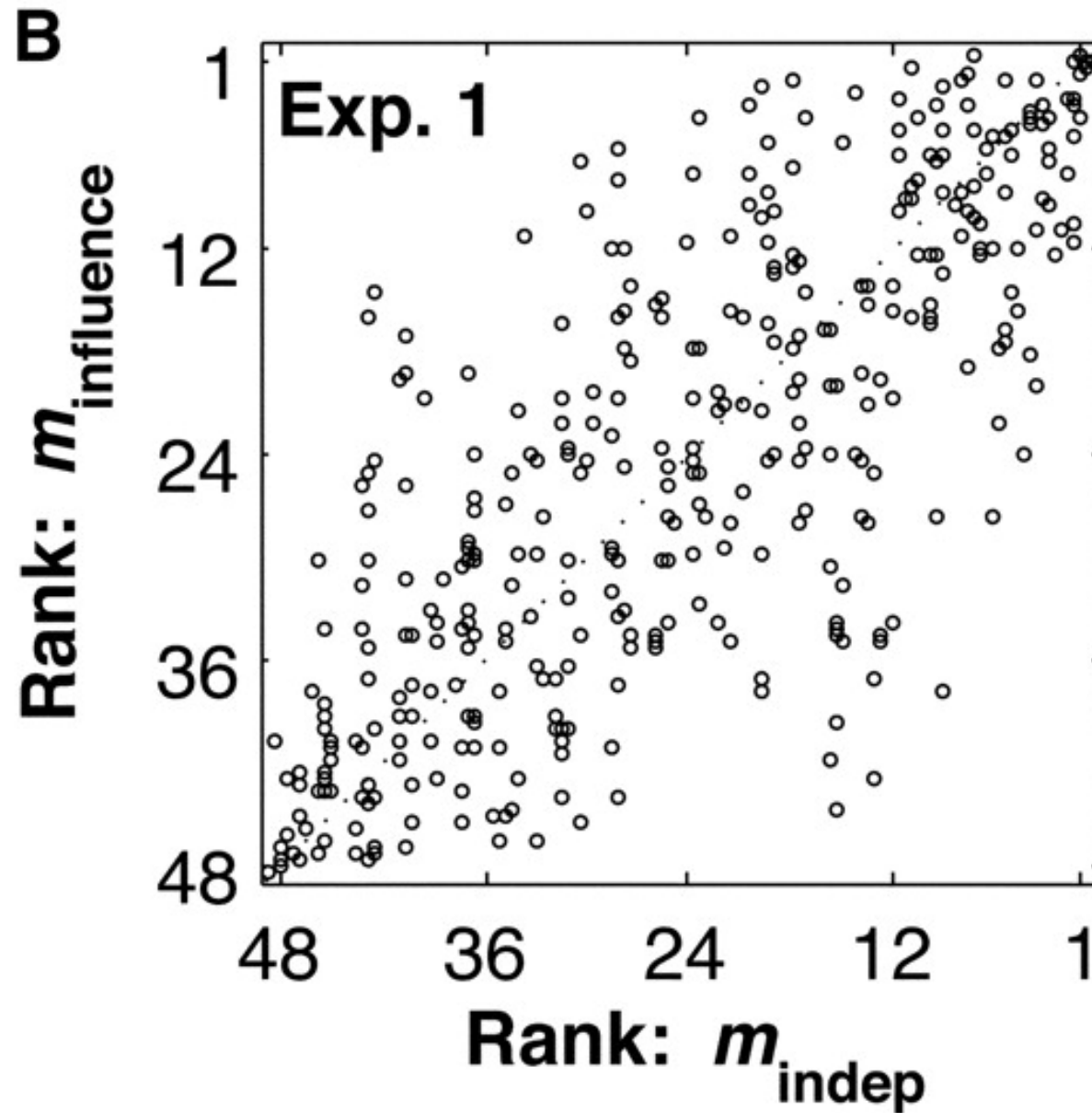
(Hartshorne & Pinker, in prep)

Geography of Personality



(Bleidorn et al., 2016)

Music popularity vs. quality



(Salganik, Dodds, & Watts, 2006)

Demographics & Visual Preferences

Preferred by under-20s

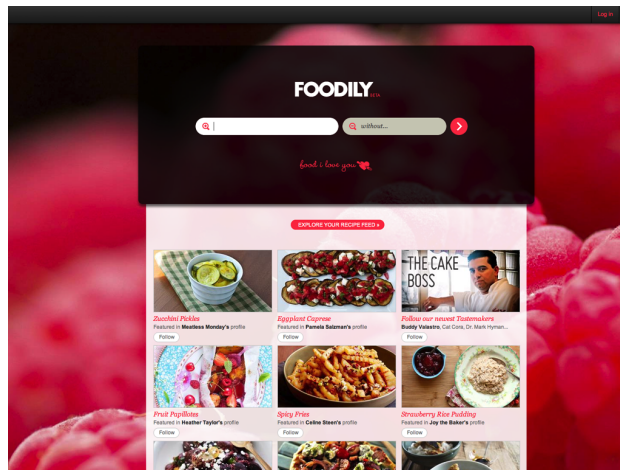


(a) under 20=7.2, over 51=5.4

Preferred by over-51s



(b) under 20=3.0, over 51=4.8



(c) under 20=7.1, over 51=5.7



(d) under 20=3.5, over 51=5.0

Crowdsourcing Linguistic Judgments

The screenshot shows the 'Games With Words' website interface. At the top, there's a navigation bar with 'Logout', 'VerbCornerHome', 'About', and 'GamesWithWords'. Below this is a 'General Leaderboard' table with columns for Rank, Username, and Points. The table lists users like 'gagner', 'tanivo', 'akozol', 'ardalin', 'fpc', 'hege', and 'jkh'. To the right of the table is a 'Badges Earned' section with four categories: 'Entropy', 'Simon Says Freeze', 'Explode on Contact', and 'Philosophical Zombie Hunter'. Each category has a grid of yellow circular badges with numbers representing progress. The 'Entropy' category has 5 badges (25, 50, 100, 150, 200). 'Simon Says Freeze' has 5 badges (25, 50, 100, 150, 200). 'Explode on Contact' has 5 badges (25, 50, 100, 150, 200). 'Philosophical Zombie Hunter' has 5 badges (300, 400, 600, 750, 1000). The 'Entropy' category is the only one with all badges filled.

Rank	Username	Points
3	gagner	21104
4	tanivo	16430
5	akozol	14188
6	ardalin	5000
7	fpc	2198
8	hege	1897
9	jkh	1874

Badges Earned:

- Entropy: 25, 50, 100, 150, 200
- Simon Says Freeze: 25, 50, 100, 150, 200
- Explode on Contact: 25, 50, 100, 150, 200
- Philosophical Zombie Hunter: 300, 400, 600, 750, 1000

Progress (old):

1,247 verbs

7 semantic features

~10,000 volunteers

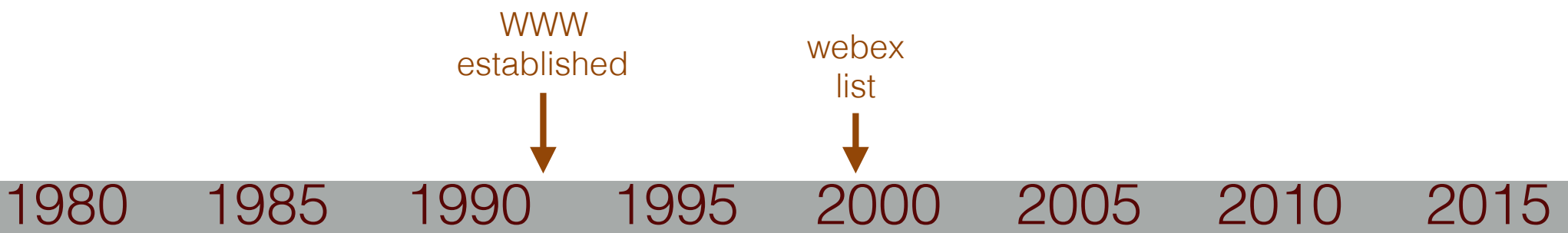
~450,000 judgments

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So are we living
the dream?





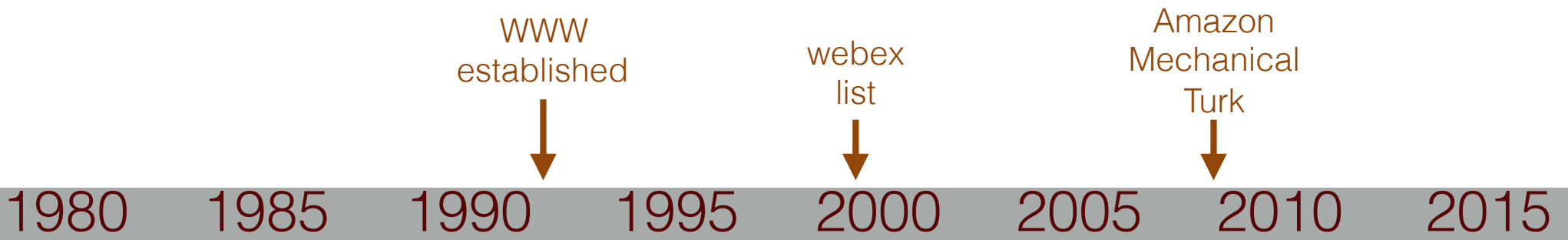
1st online
psych study

WWW
established

webex
list

In the study reported in this paper, EMS [Electronic Mail Service] was clearly the preferred data-collection method because it produced adequate data, response rates, and willingness for further participation, with little expenditure of researcher time or effort and a high degree of convenience for respondents – Sproull (1986), p. 167

27% of APA journals
have published online studies



1st online
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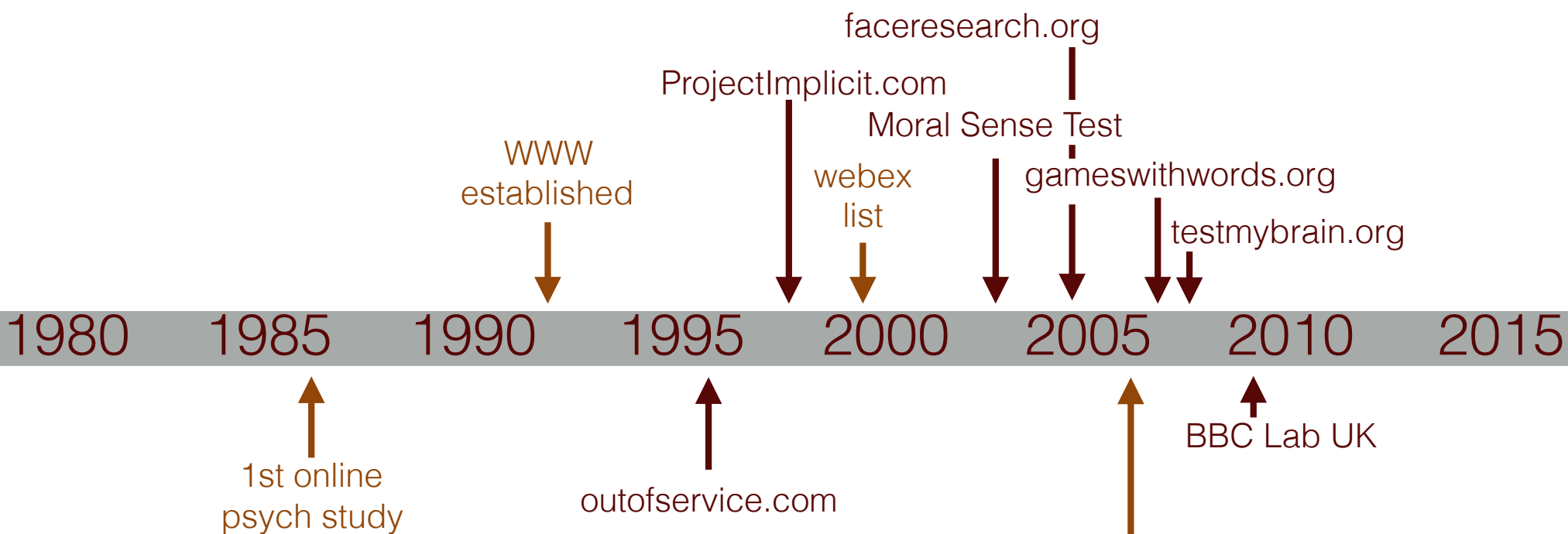
WWW
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webex
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Amazon
Mechanical
Turk

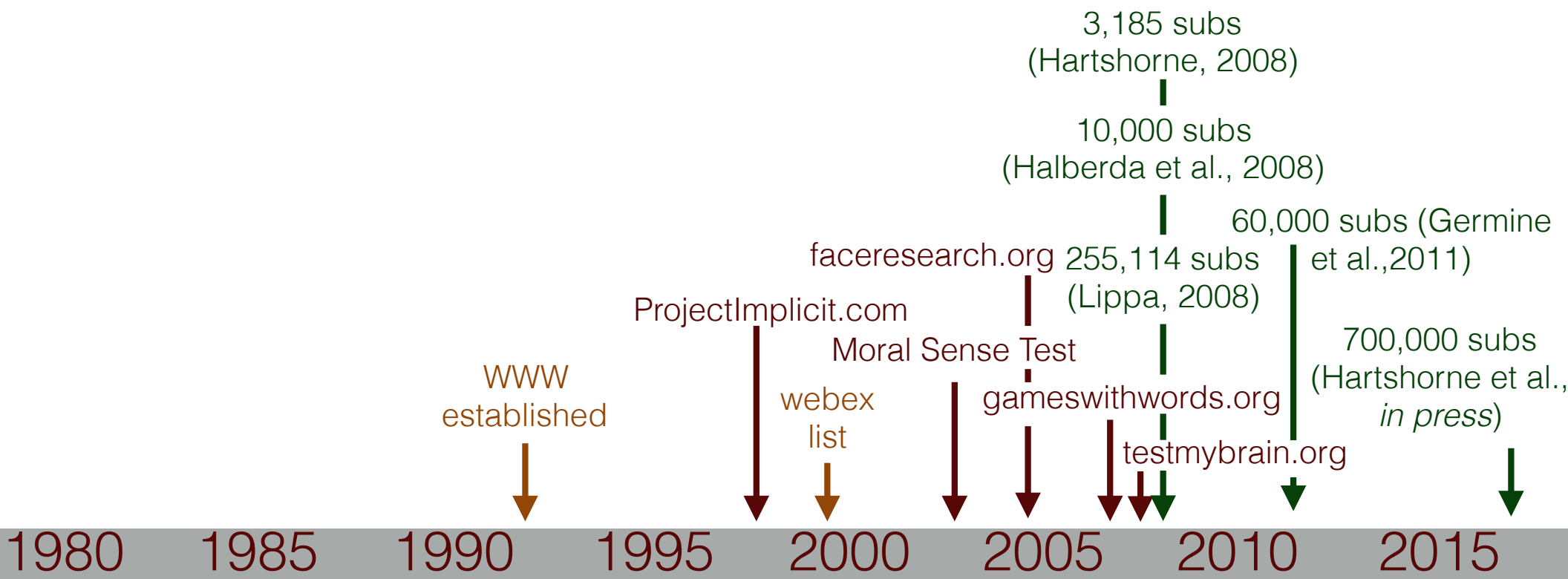
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1980 1985 1990 1995 2000 2005 2010 2015

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Barriers to Use

- Paradigm shift
 - “I don’t need that many subjects”
 - “My studies take more than 10 minutes!”
 - Recruitment: I can’t pay 1,000,000 subjects
 - What studies aren’t we running?
- Software
 - Robust scaling
 - Dynamic experiment design
 - Optimal Experimental Design
 - Active Learning
 - “Pipeline” experiments
 - Tracking repeat subjects / longitudinal data
 - Recruitment
 - Feedback, social media integration, mailing lists
 - Citizen Science
 - Forum, badges, etc.
- Analysis



Pushkin

robust tools for
massive online
experiments

- **Completed**

- Stimuli: Text, video, audio, images
- Responses: Keyboard, RTs (within-subject), drag-and-drop
- Mobile-friendly webpages
- Stub website
- Auto-scaling (mostly)
- (Limited) dynamic stimulus selection

- **Available soon**

- “Endless” quizzes
- Support for robust dynamic stimulus section
- Interactive forum
- Badges & leaderboards
- Social media *authentication*
- Profile page
- Simplified social media *integration*
- Eyetracking / preferential looking

- **On deck**

- OED & Active Learning with WebPPL
- Experiment templates
- “Pipeline” experiments
- [Insert your ideas here]

