Psychoinformatics & Neuroinformatics

Week 6

Web Frontend

by Tsung-Ren (Tren) Huang 黃從仁

Why bother frontend development

Carrying out large-scale experiments

Breaking the limits of time and space

Preparing for backend & mobile development

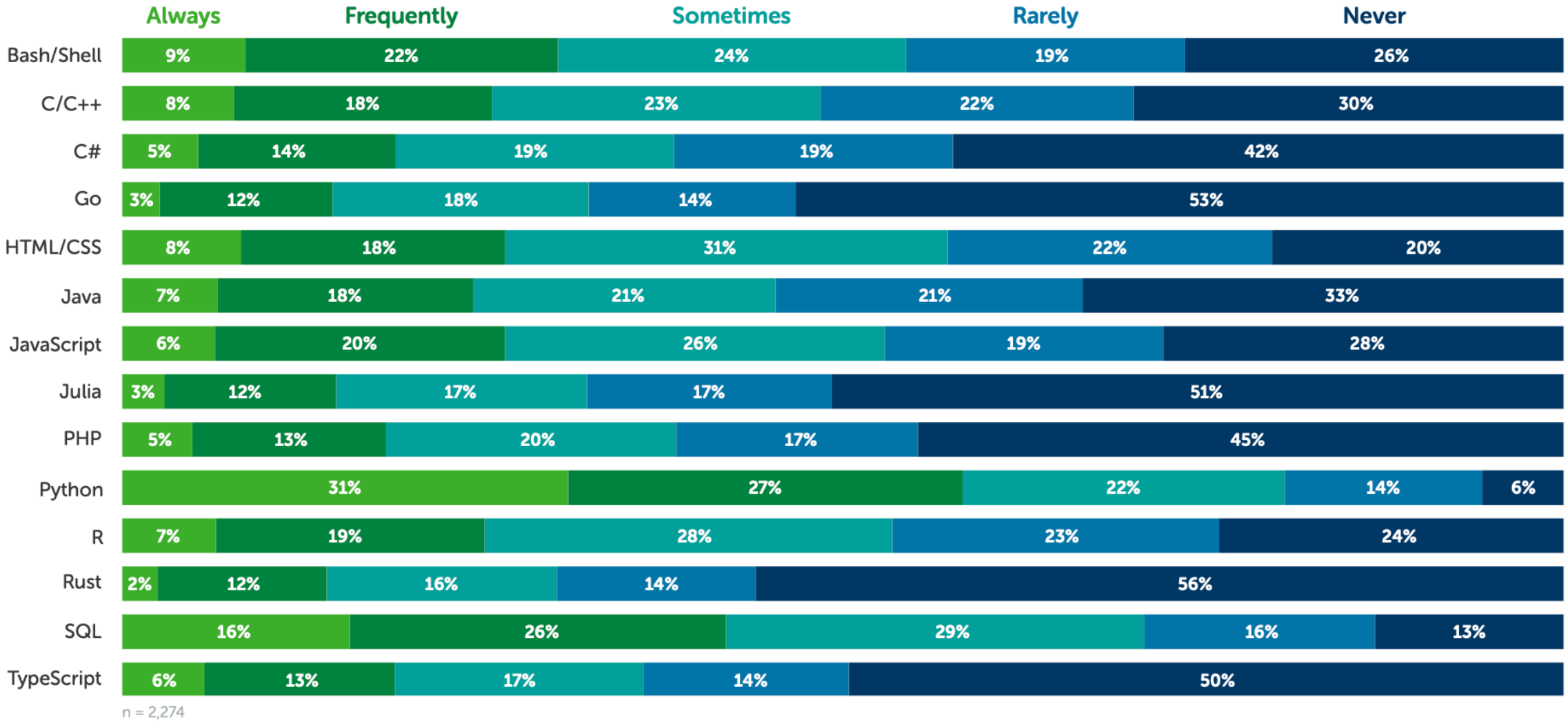
JavaScript is everywhere

Offering interactive analyses to users

E.g., data visualization, ML/DL-based analytics

Frontend development

NOT a required skill for data science/engineering, but…



Relevant jobs

Mostly looking for software/frontend engineers, but sometimes "data frontend engineers" or someone full-stack:

Apple ★★★★☆ 11,247 reviews
Seattle, WA

You must create an Indeed account before continuing to the company website to apply

Apply on company site

Job Company

Benefits

Pulled from the full job description

Opportunities for advancement

and analysis of the user experience. As a Data Visualization Engineer on the team, you will be an ambassador of analytics to product and engineering teams with the ultimate purpose of improving the Siri experience for Apple customers.

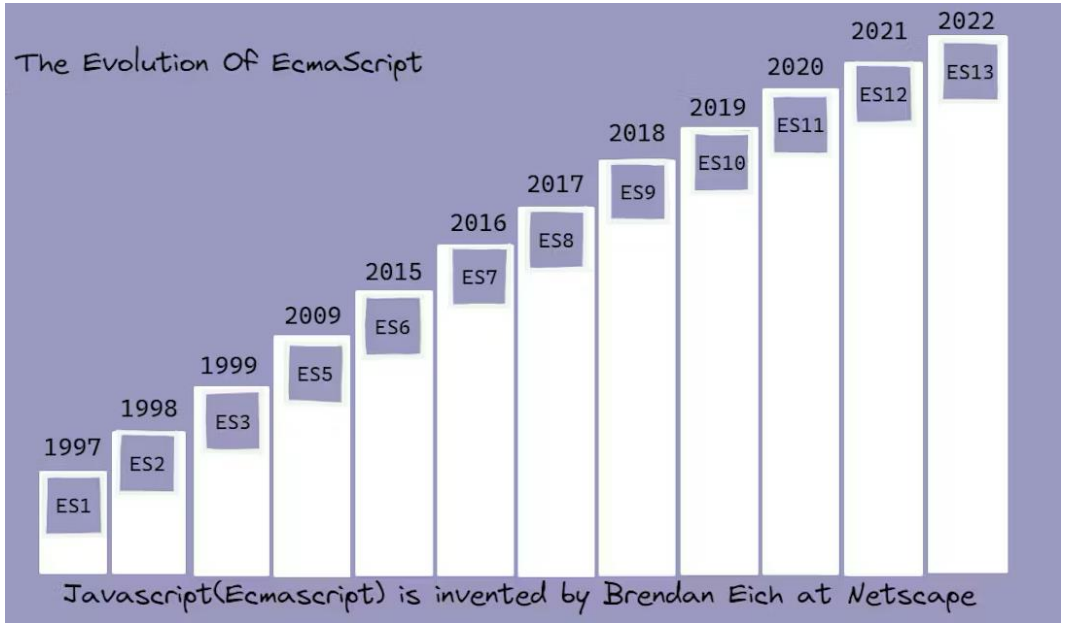
Key Qualifications

- Think about data in terms of statistical distributions and have good instincts for how to find patterns and identify insights.
- Have good judgment for balancing art and science when visually communicating information.
- Have experience building analytical front-end applications using React and other UI frameworks.
- Have expertise in modern Javascript and data visualization libraries (e.g. D3, VisX, Vega). Data visualization skills are a plus
- Familiarity with API development using web frameworks (e.g., Express). Knowledge of GraphQL is a plus.
- Experience with testing frameworks (e.g. Jest, Mocha).
- Can build information out of massive and complex datasets optimally (e.g. Hive, Spark SQL, Druid, Solr).
- Have familiarity with at least one backend programming language (e.g. Python) and are comfortable developing tools in a team environment (e.g. git, documentation, testing).

Goals for today

Learning no-code/low-code solutions

Fast for typical tasks



Learning IMPERATIVE JavaScript

Old vs. modern versions/syntaxes

Learning DECLARTIVE frameworks

Primarily Facebook's React

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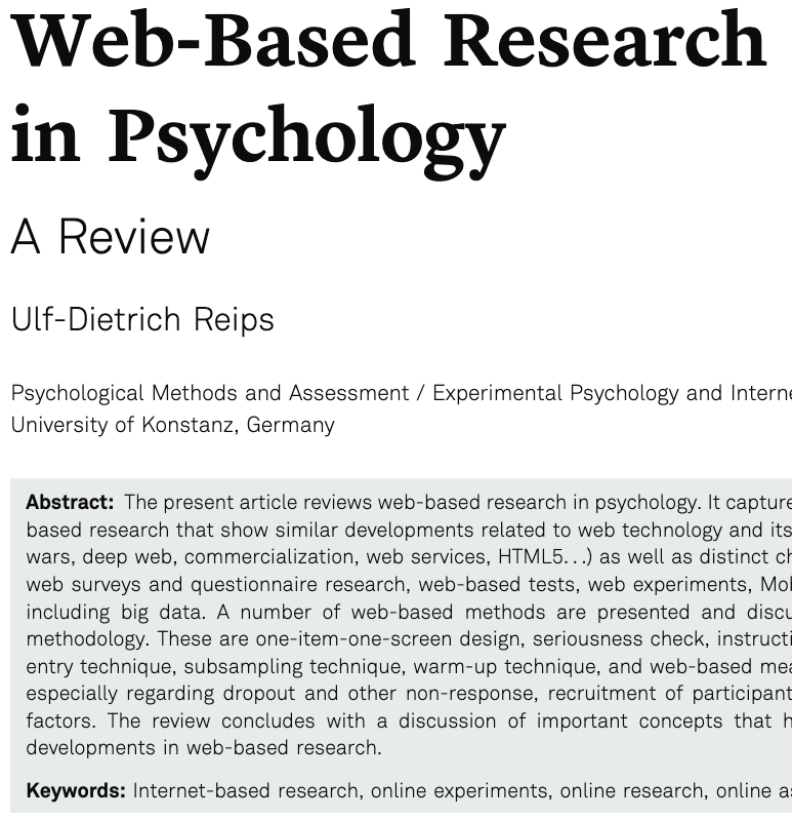
Web experiments: Big Experimental Data

There are opportunities and challenges



Web-Based Research in Psychology

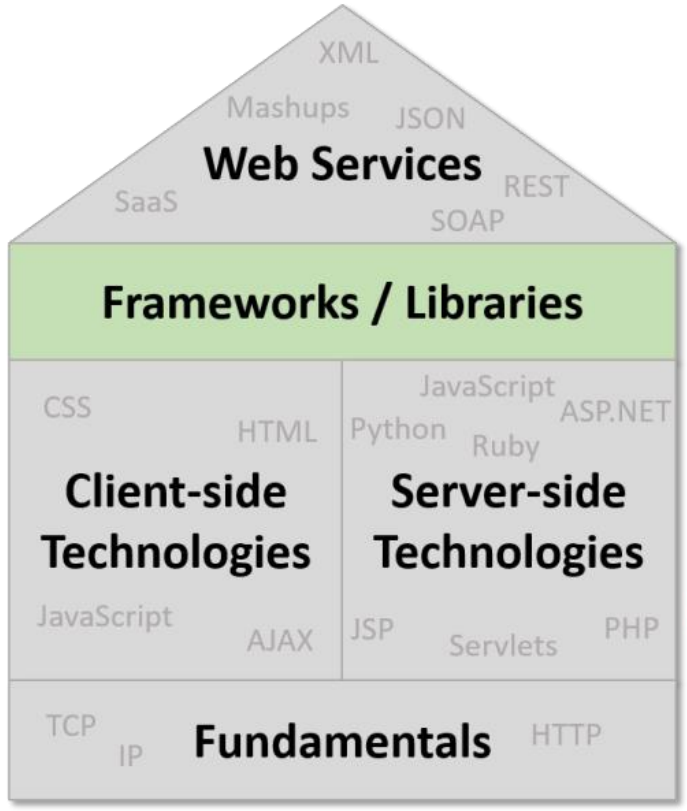
A Review

Ulf-Dietrich Reips

Psychological Methods and Assessment / Experimental Psychology and Interne
University of Konstanz, Germany

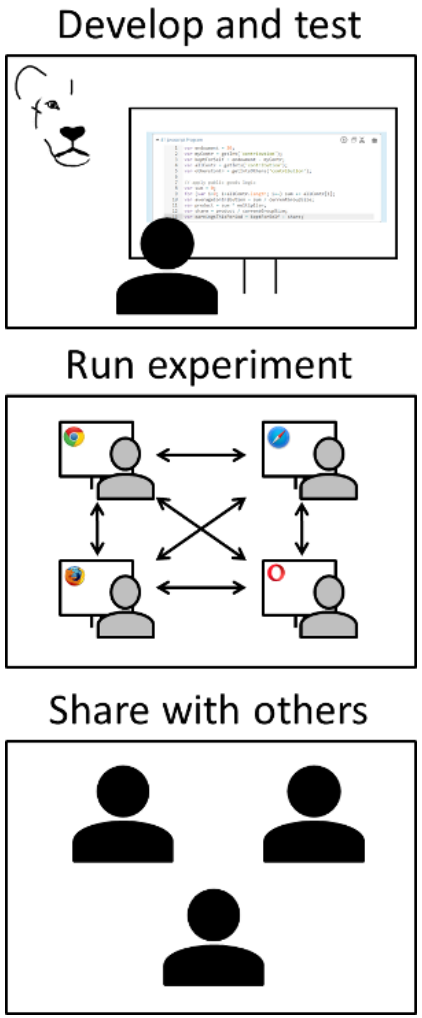
Abstract: The present article reviews web-based research in psychology. It capture
based research that show similar developments related to web technology and its
wars, deep web, commercialization, web services, HTML5. . .) as well as distinct ch
web surveys and questionnaire research, web-based tests, web experiments, Mol
including big data. A number of web-based methods are presented and discu
methodology. These are one-item-one-screen design, seriousness check, instructi
entry technique, subsampling technique, warm-up technique, and web-based mea
especially regarding dropout and other non-response, recruitment of participant
factors. The review concludes with a discussion of important concepts that h
developments in web-based research.

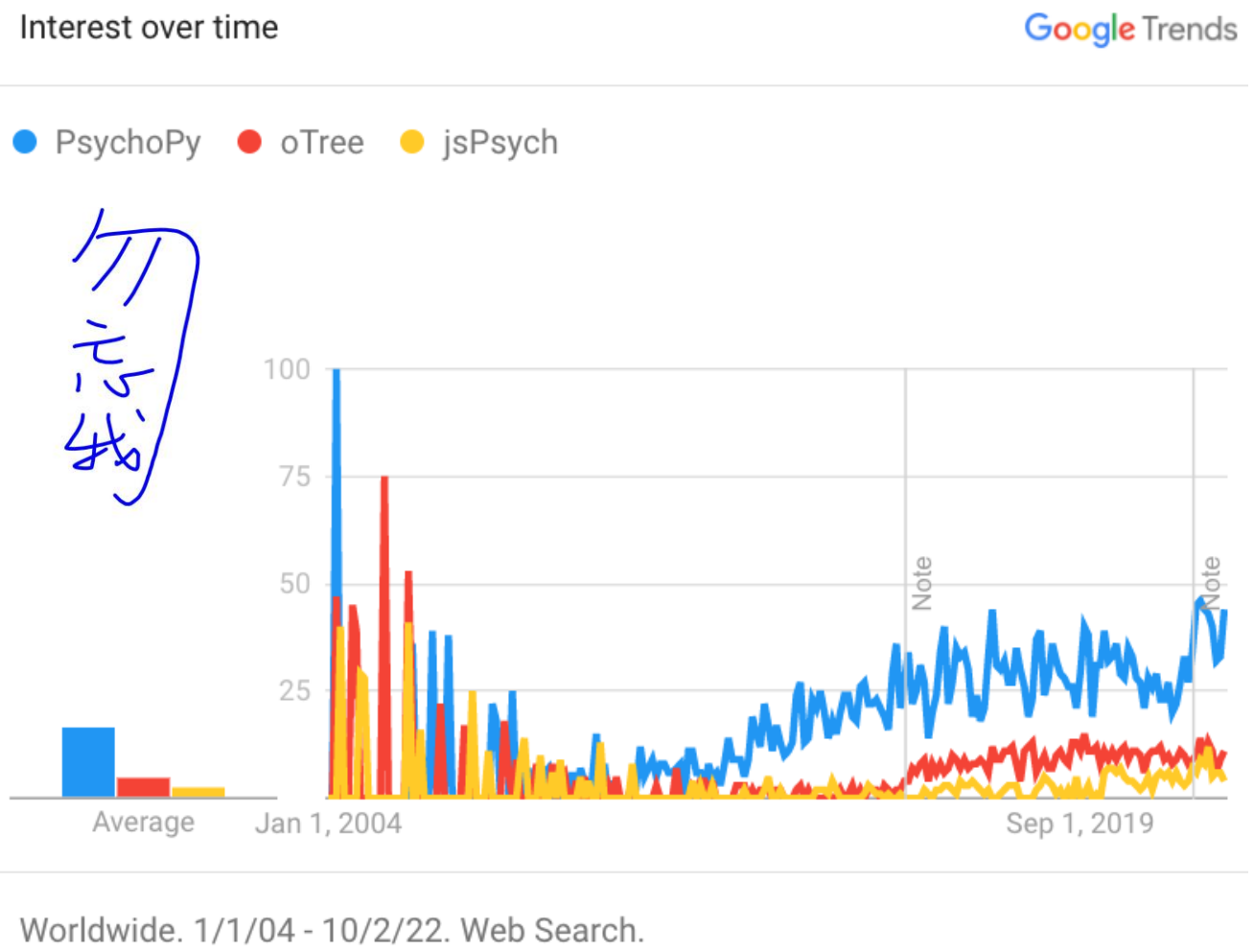
Keywords: Internet-based research, online experiments, online research, online a



Developing experiments

Ease: jsPsych > PsychoPy (exporting is hard) > oTree (more codes)





Personality & Game Behavior

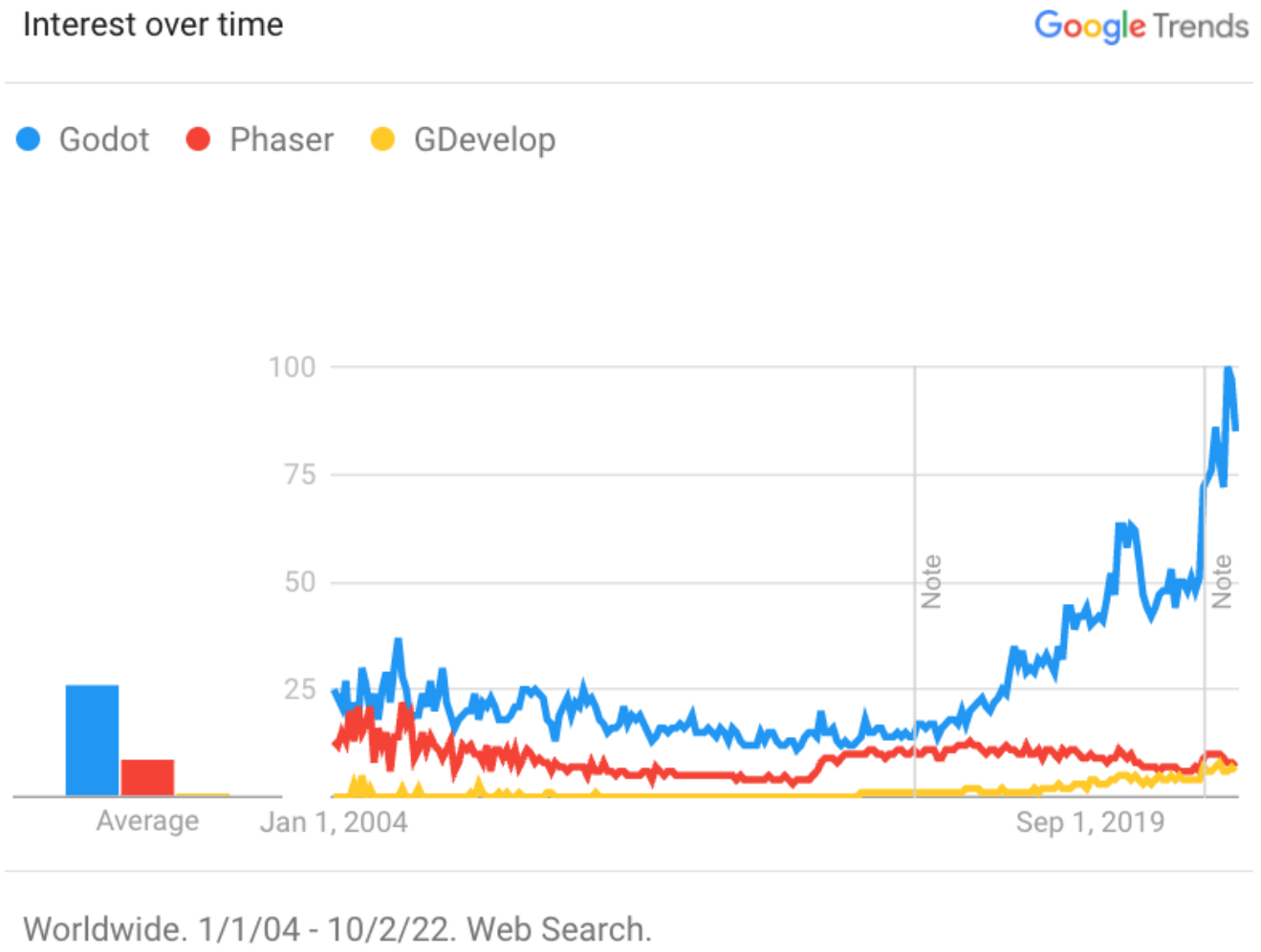
Personality can be predicted from game behavior

		Agreeableness	Conscientiousness	Emotional stability	Extraversion	Openness
Random Effects	gender	✓		✓	✓	✓
	age		✓	✓	✓	✓
	region	✓			✓	
Fixed Effects	control	-1.34	1.03	3.28	-0.72	1.59
	damage	-1.04	-3.82		1.47	1.45
	difficulty	-1.47		-1.49	-1.49	-2.34
	mobility	0.76		-2.06	4.35	-4.30
	toughness	-1.28	-2.46	-1.61	-5.24	-6.37
	utility	-0.54	1.49	1.27	-4.88	2.35
	kills	9.22	-5.26	8.71	17.28	5.64
	deaths	-8.10		-4.04	-11.9	-4.33
	assists	-2.92		-5.63	-4.36	-7.43
	win	15.6	2.56	3.05	11.92	15.31
	average duration	-0.01	-0.01	0.09	-0.03	2.53
	n_level6	0.06	-0.04	0.07	0.12	-1.73

Developing games

Ease: GDevelop > Godot > Phaser (+ nonofficial editor)

Heavy:



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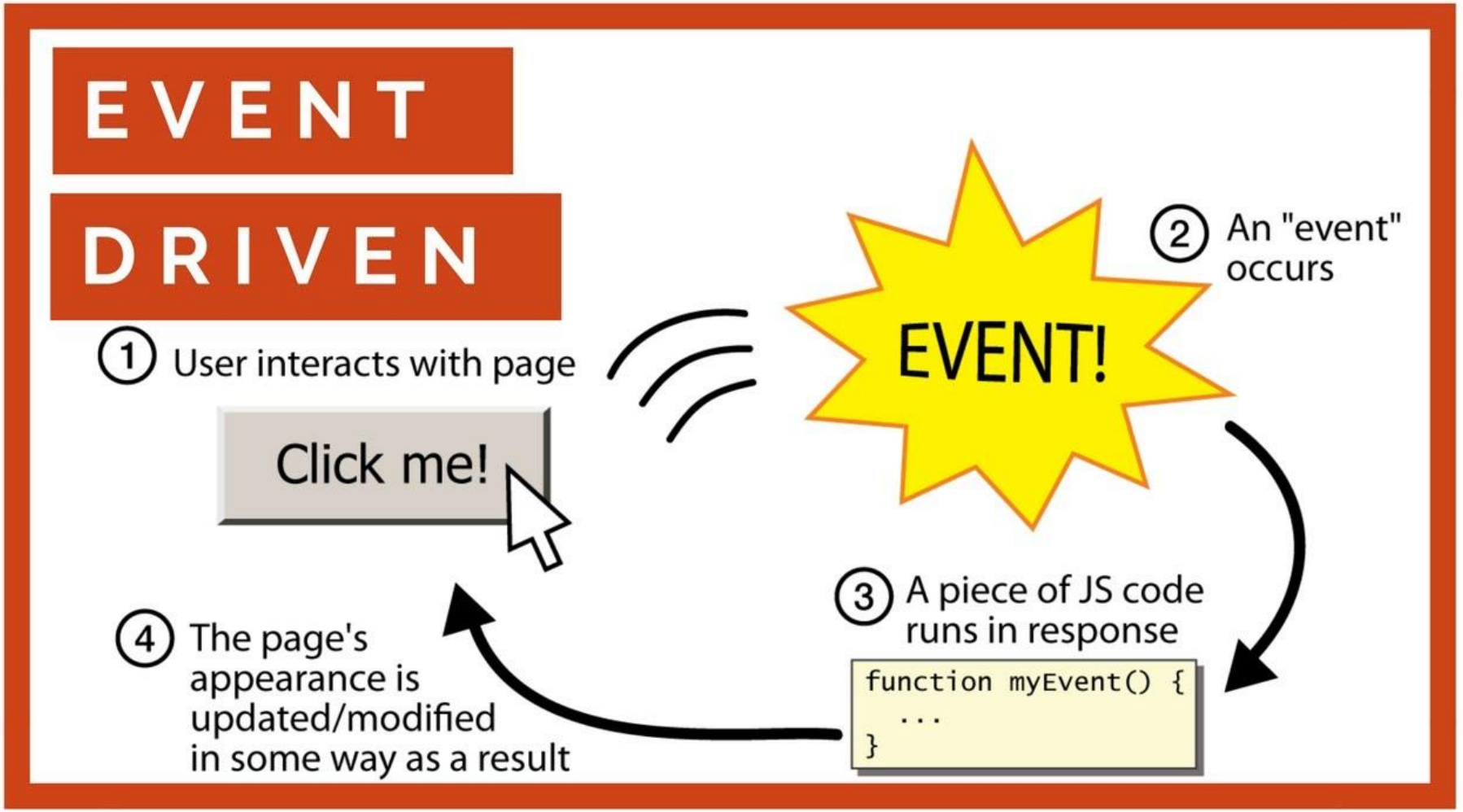
Primarily Facebook's React

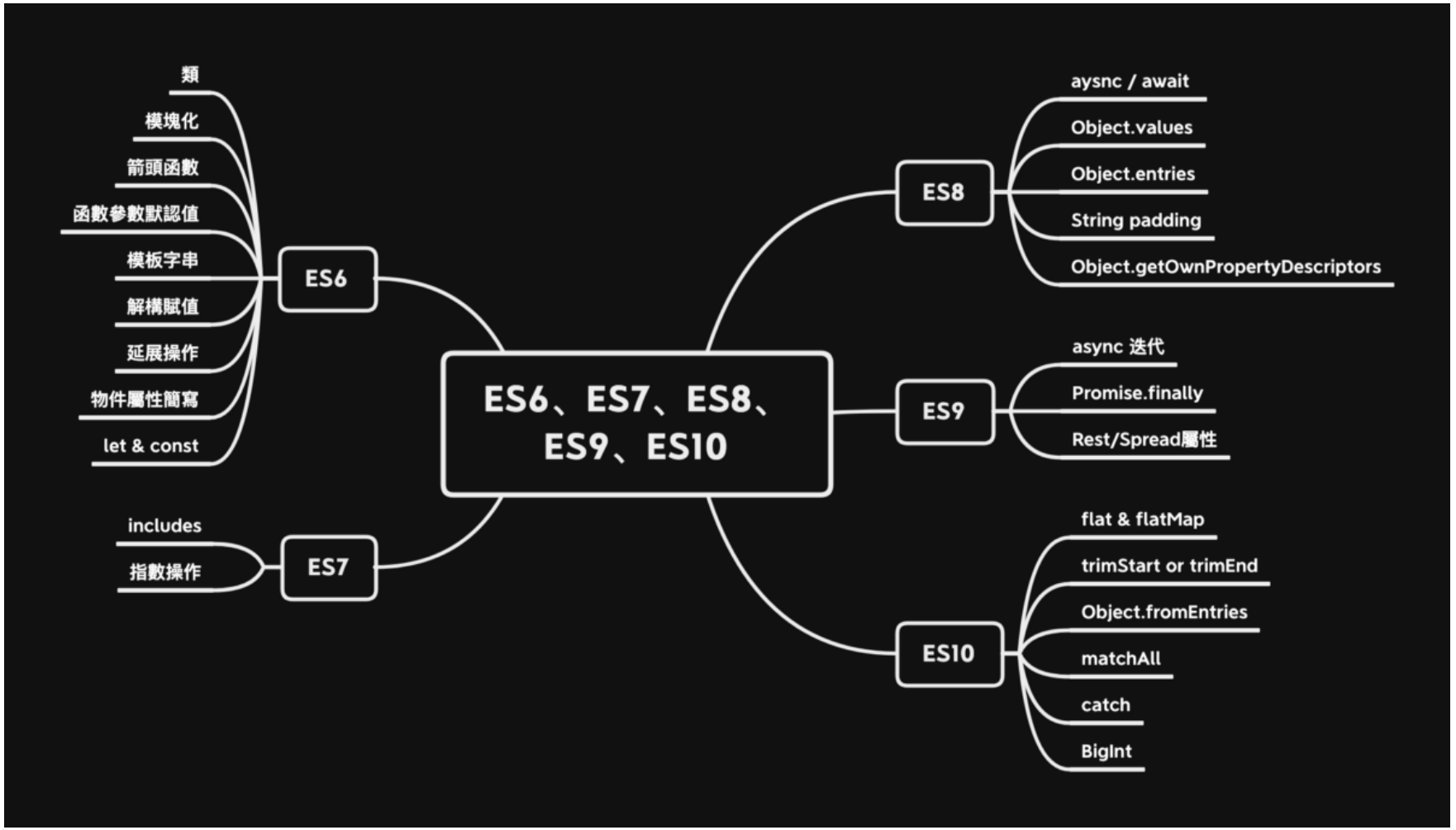
Event-driven Callback Function

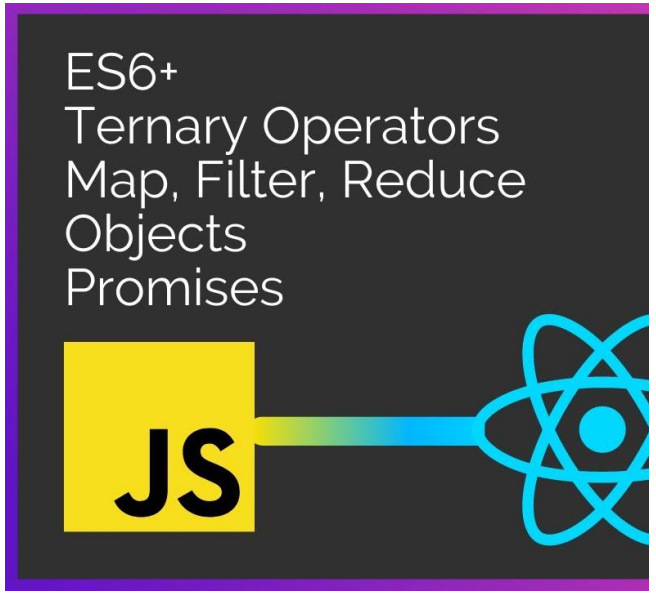
Callback functions are not executed in any planned order



ECMAScript (ES)

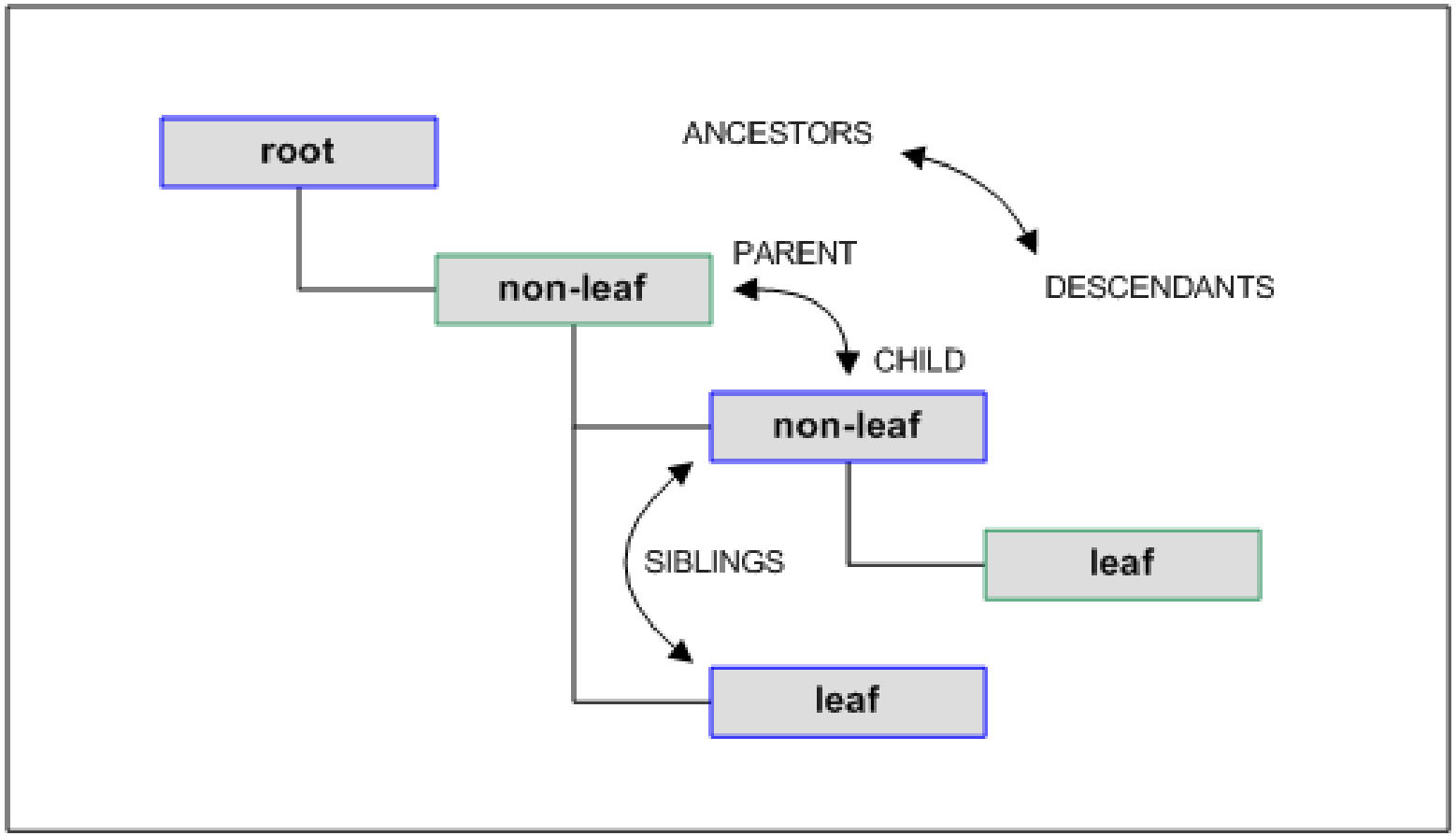
React uses many new syntaxes from ES6+





DOM & its selectors

The querySelector family use (chaining) CSS selectors



getElementById()

getElementsByClassName()

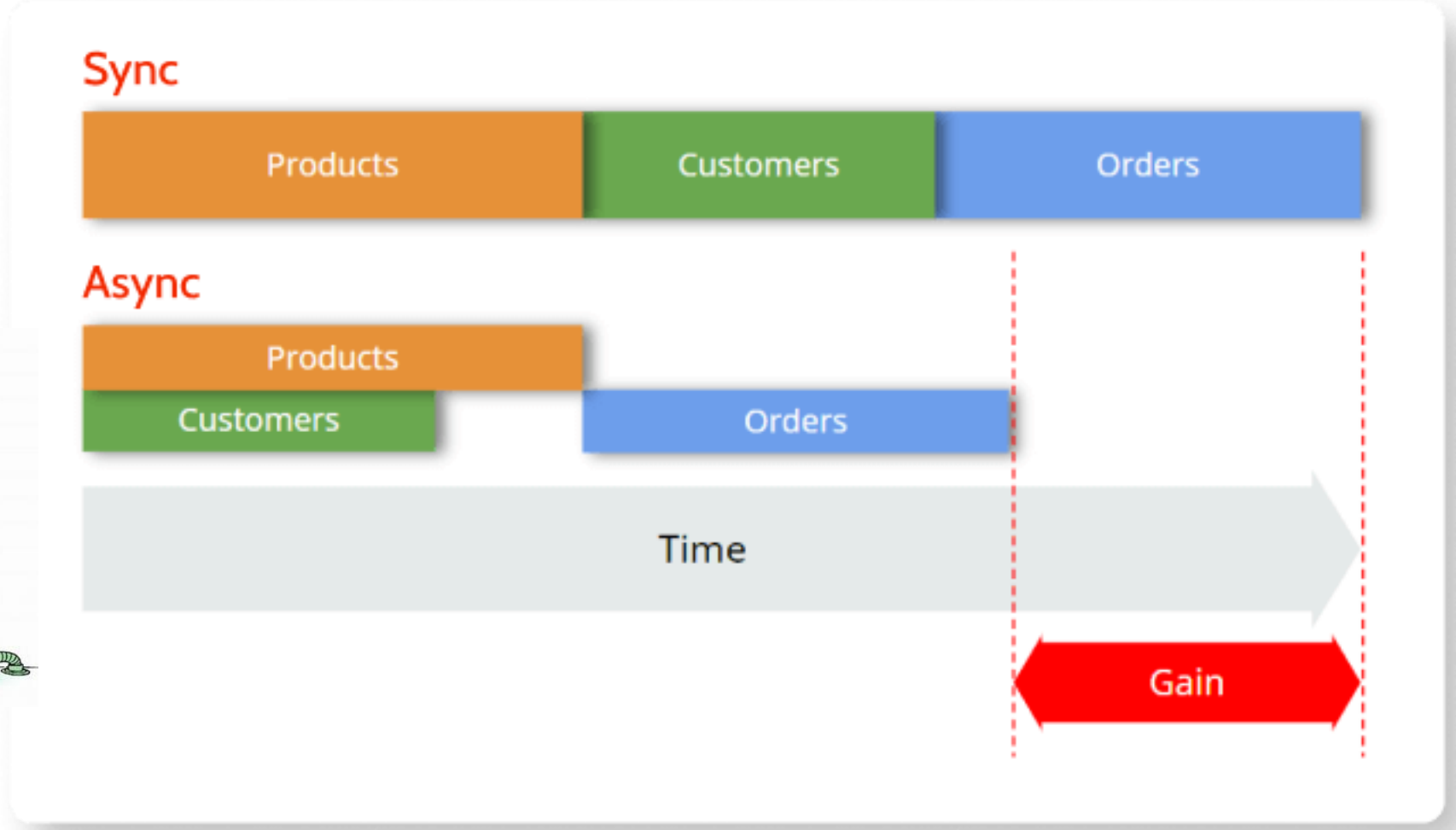
getElementsByTagName()

querySelector()

querySelectorAll()

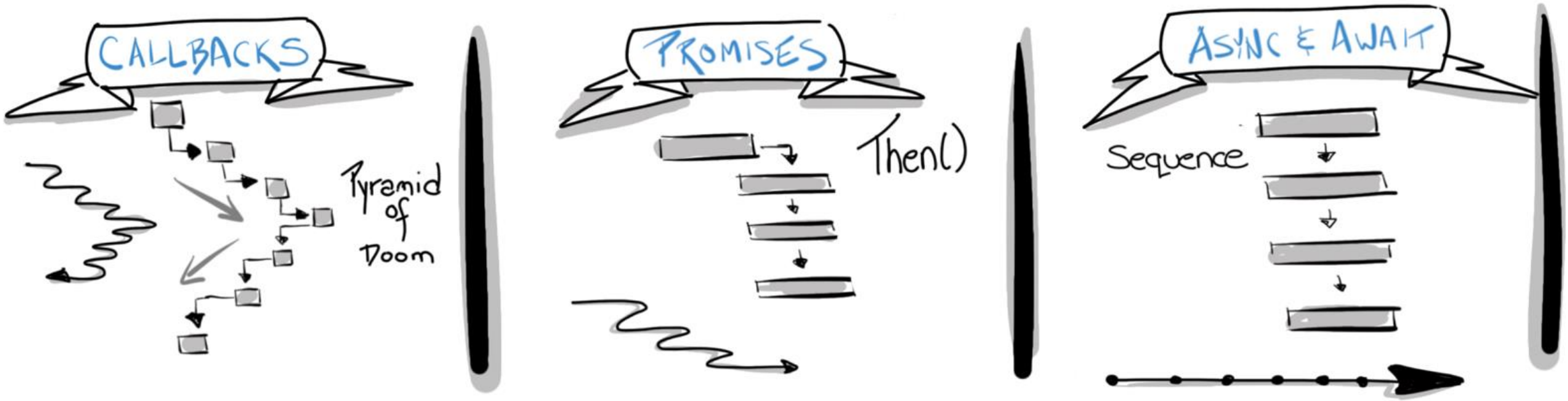
Asynchronous JavaScript

Synchronous processing would make JavaScript non-responsive



Synchronous JavaScript

Without promise/async/await, we'd have a callback hell

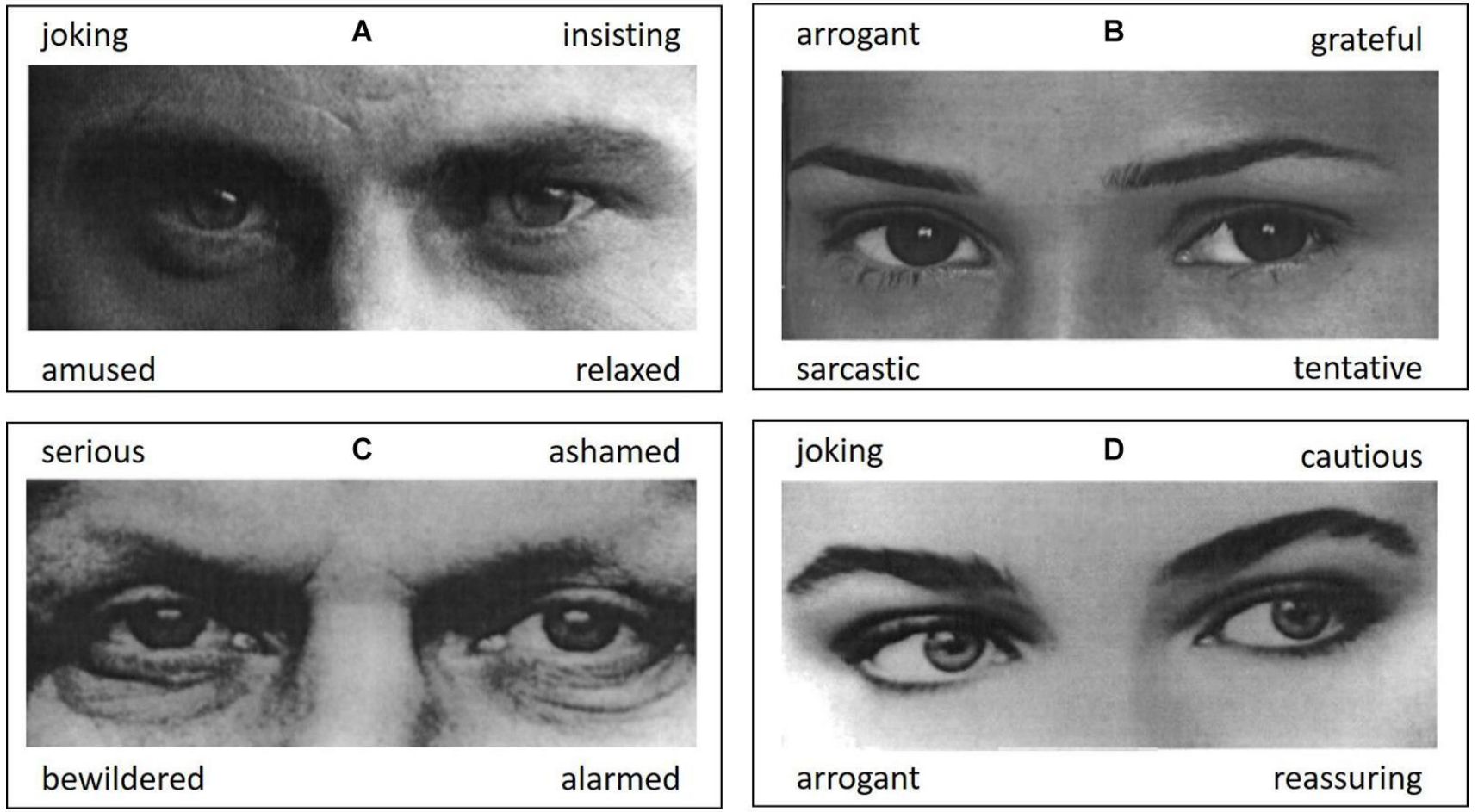


An Example:

Kid & Castano, 2013, Science

Reading Literary Fiction Improves Theory of Mind

David Comer Kidd* and Emanuele Castano*



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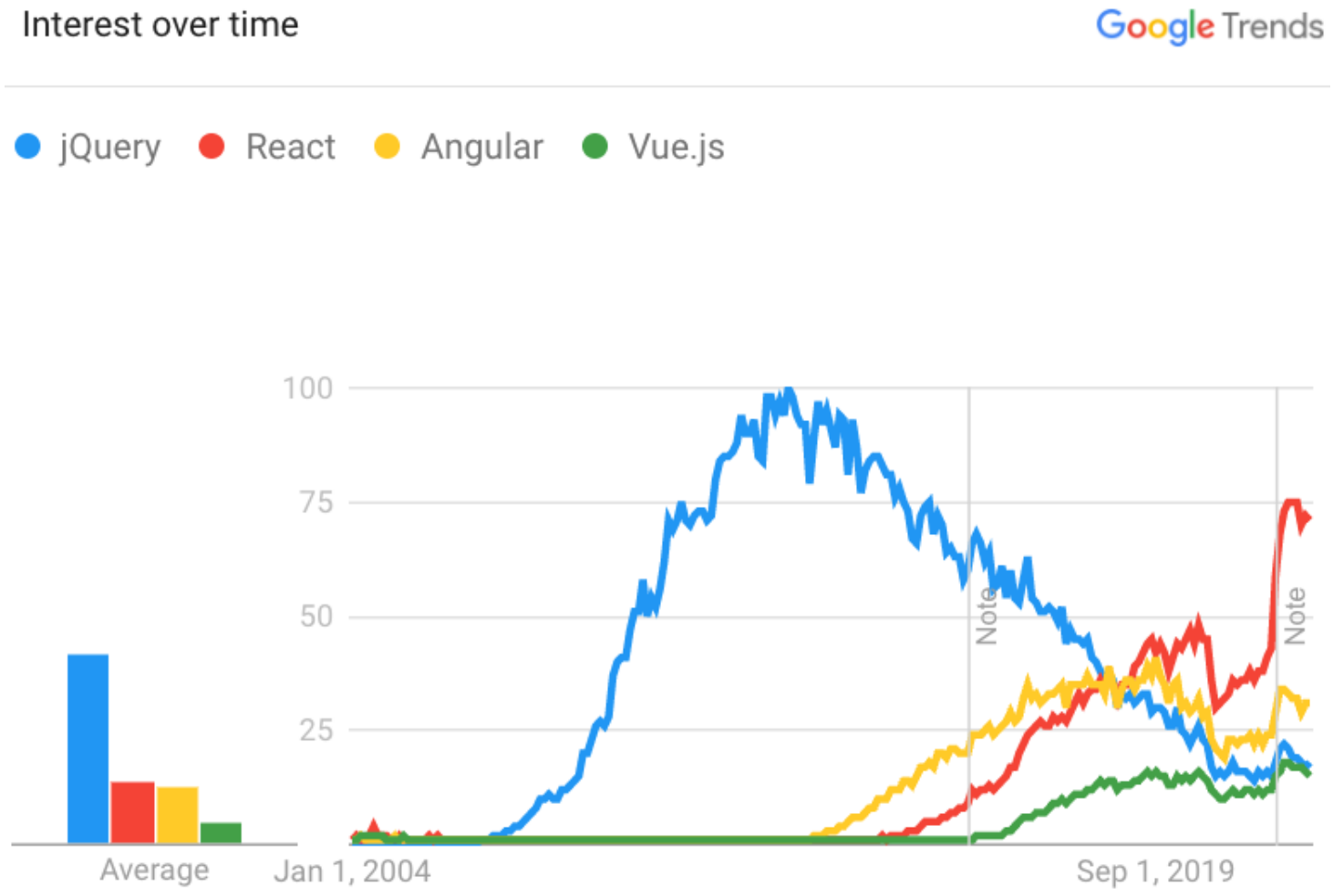
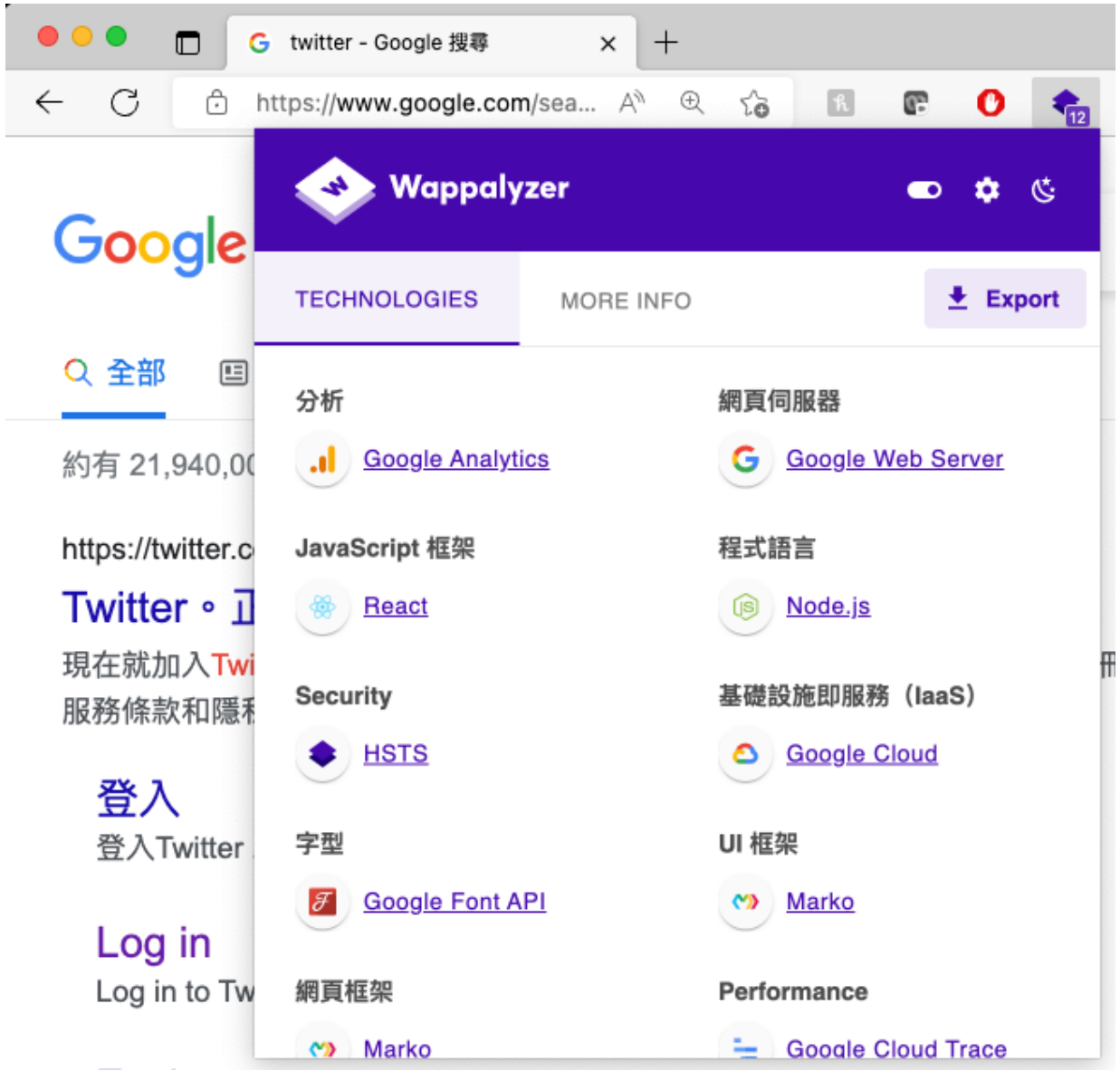
Popularity of different frameworks

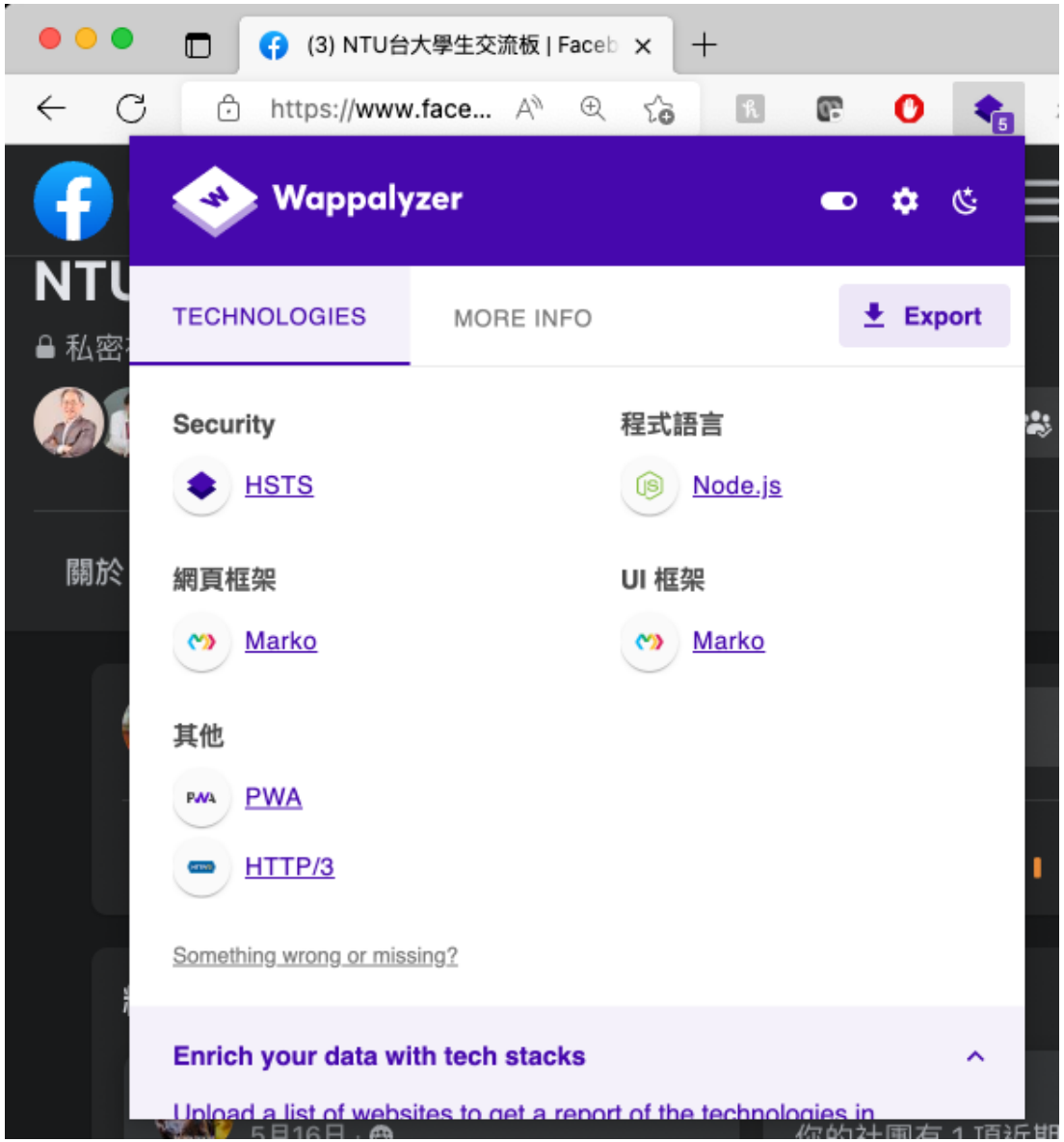


Goodbye

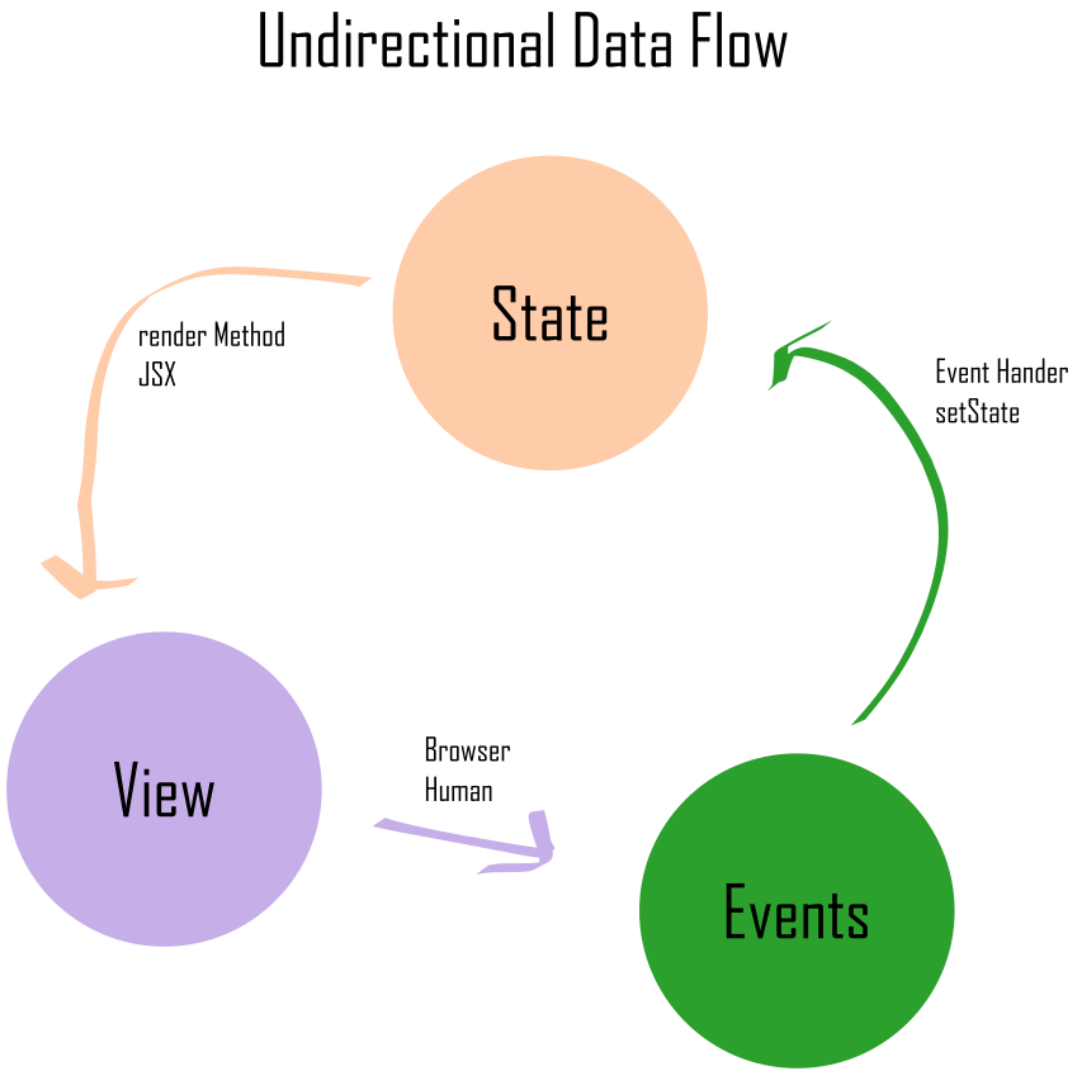
jQuery
write less, do more.

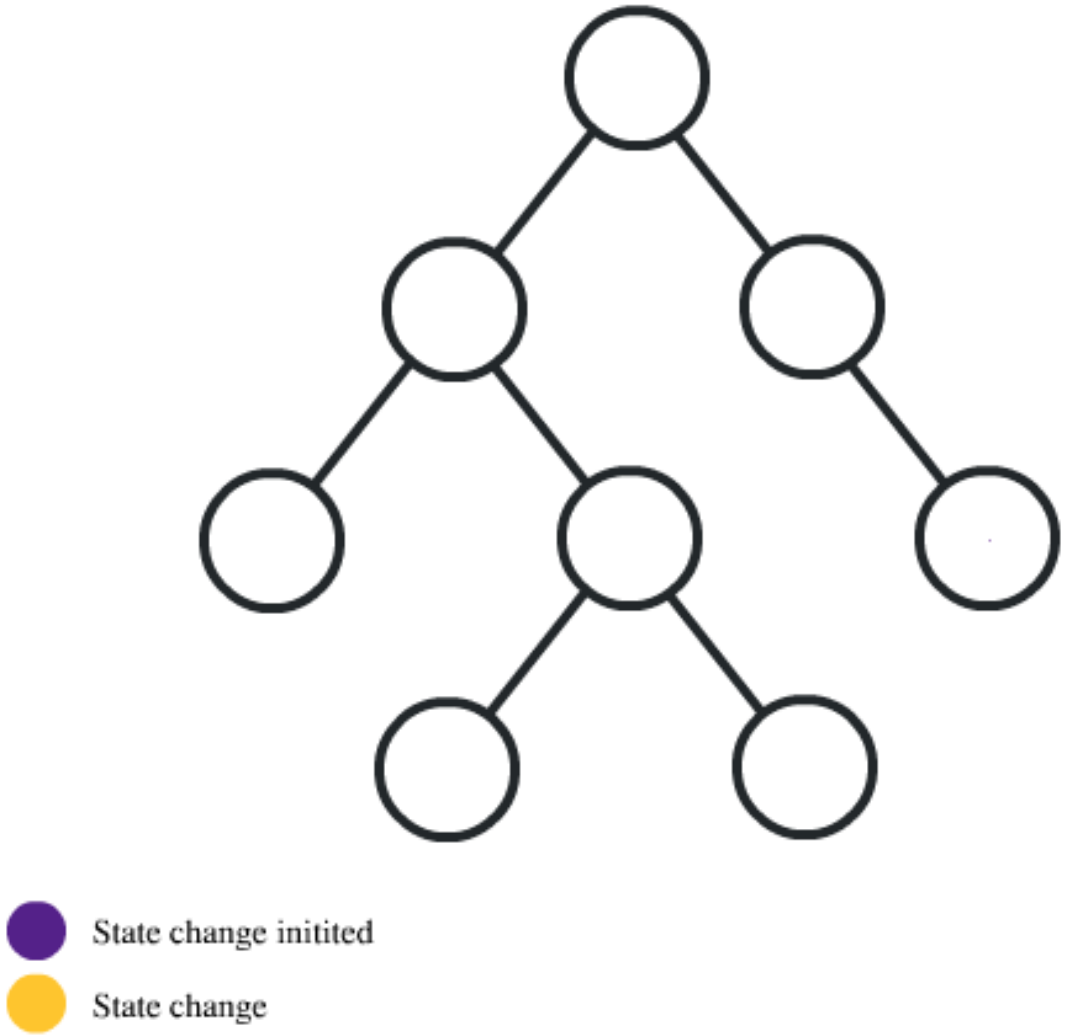
Google's Angular vs. Facebook's React





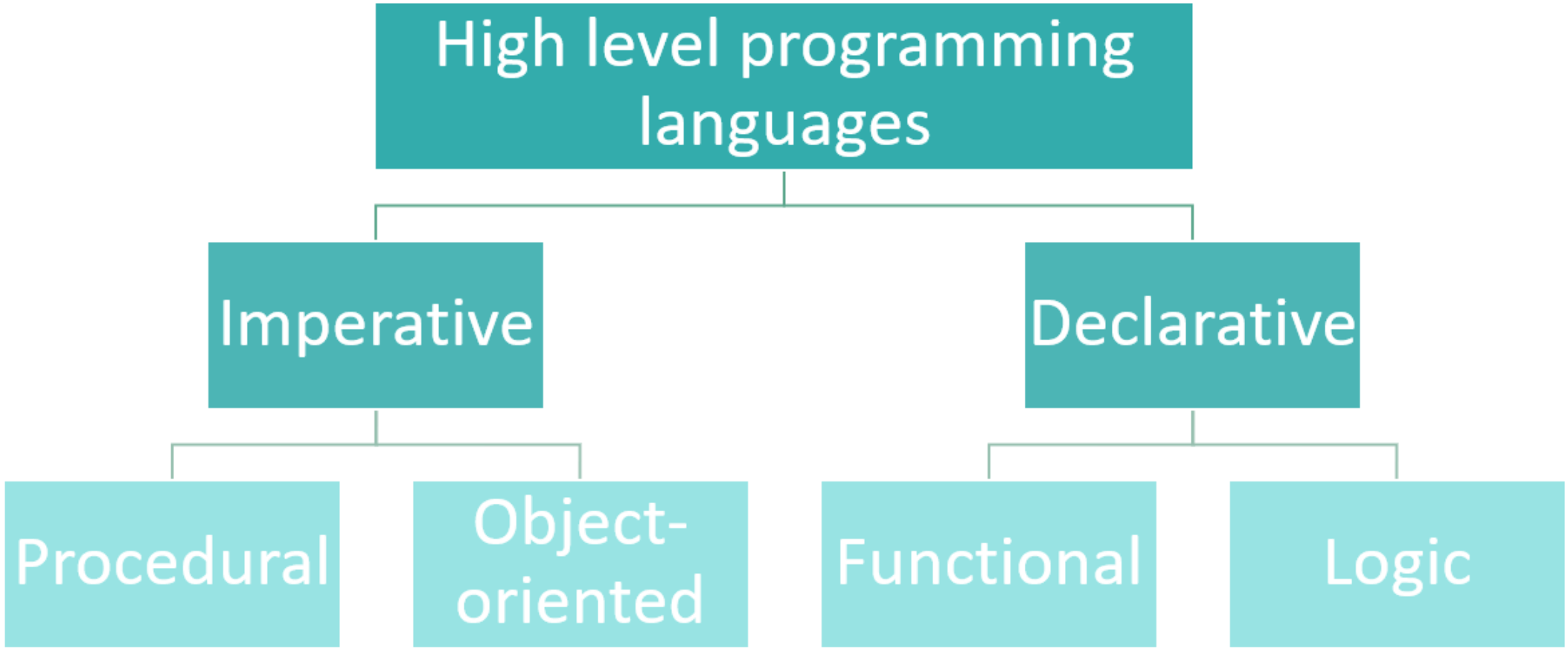
Automatically “React” to state changes





Imperative vs. Declarative Languages

Vanilla JavaScript/jQuery are imperative; React is declarative



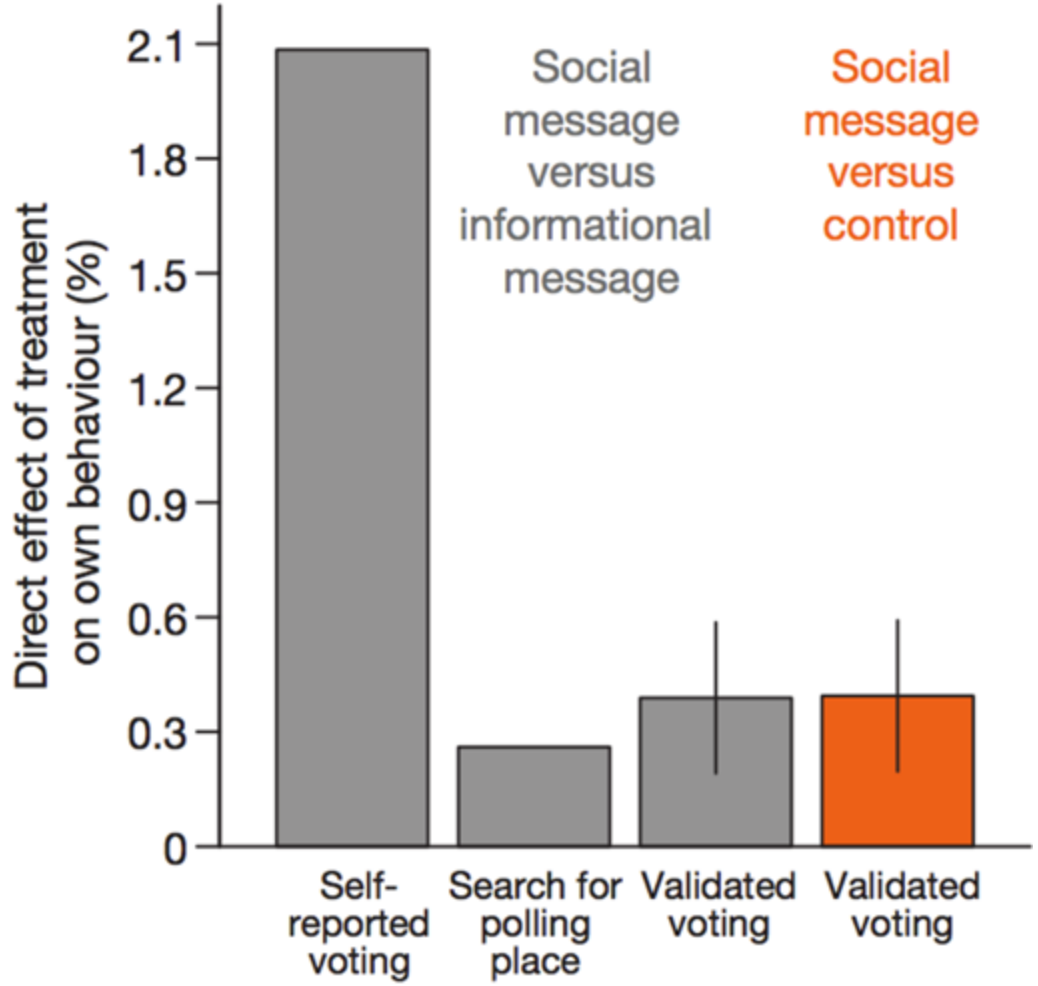
Compositional & Reusable Components

Writing React = Building & connecting components

Example 1: Social Influence

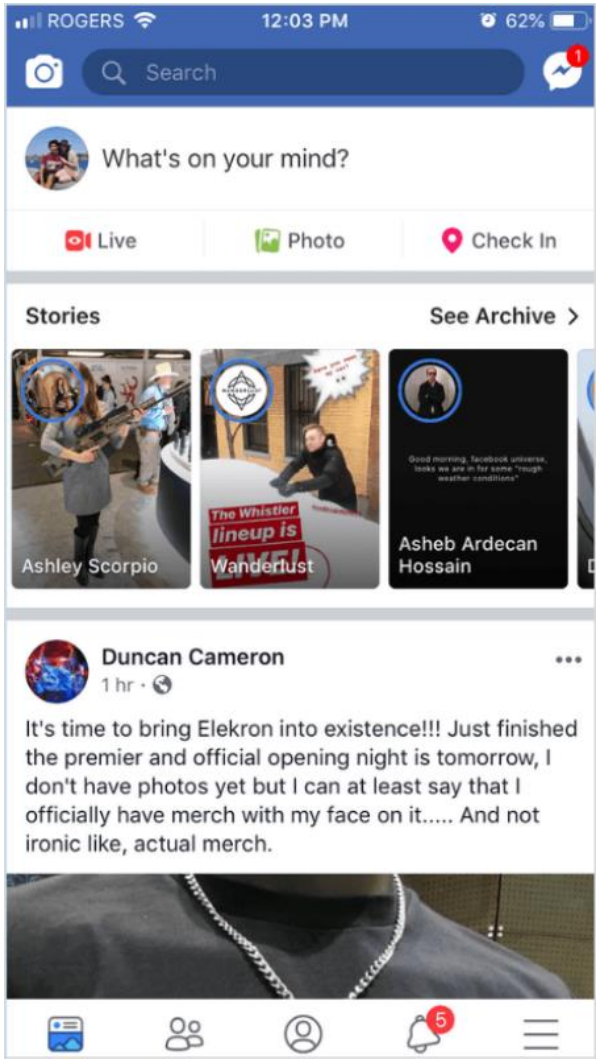
Informational message

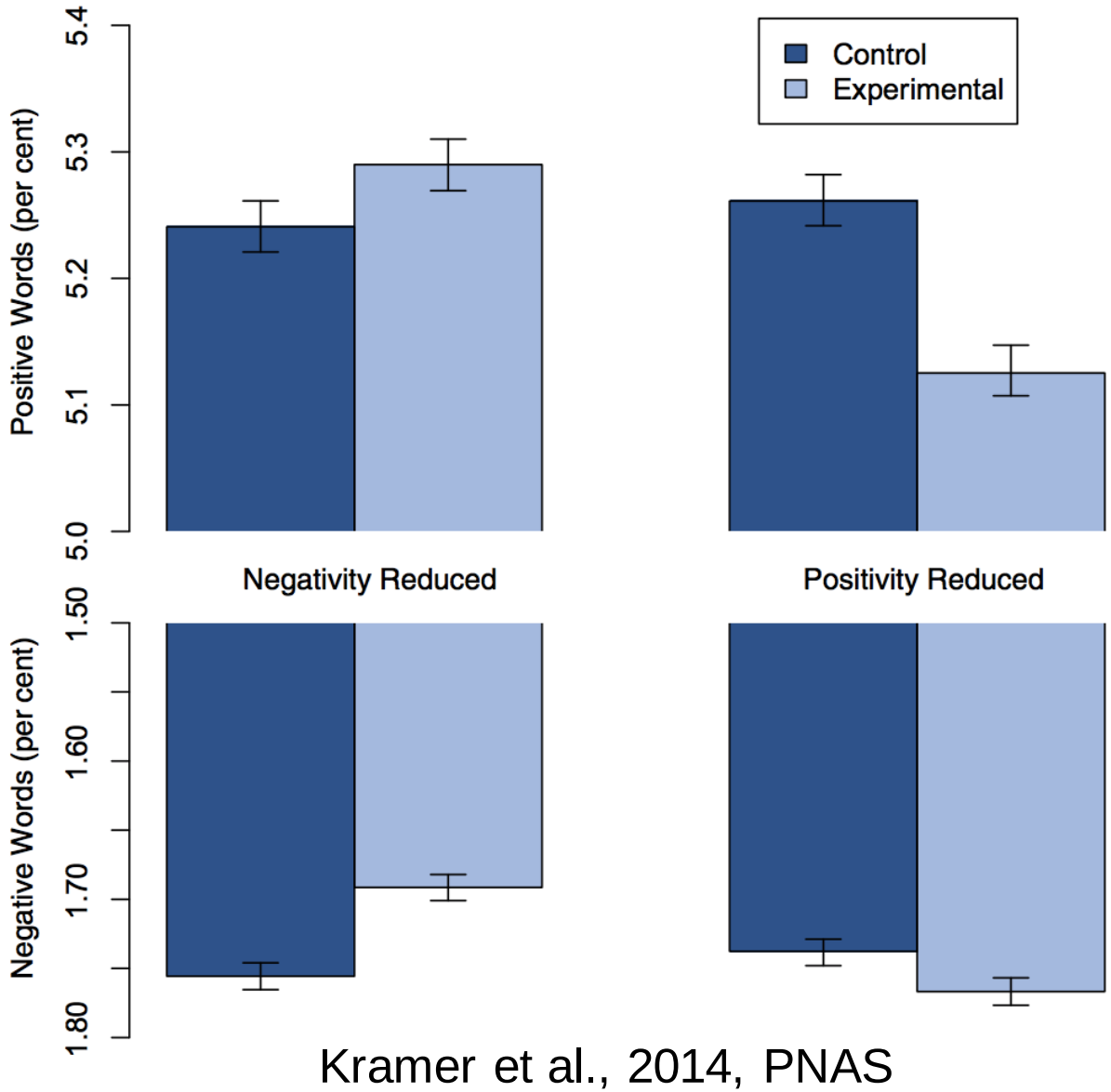
Social message



Bond et al., 2012, Nature

Example 2: Emotional Influence

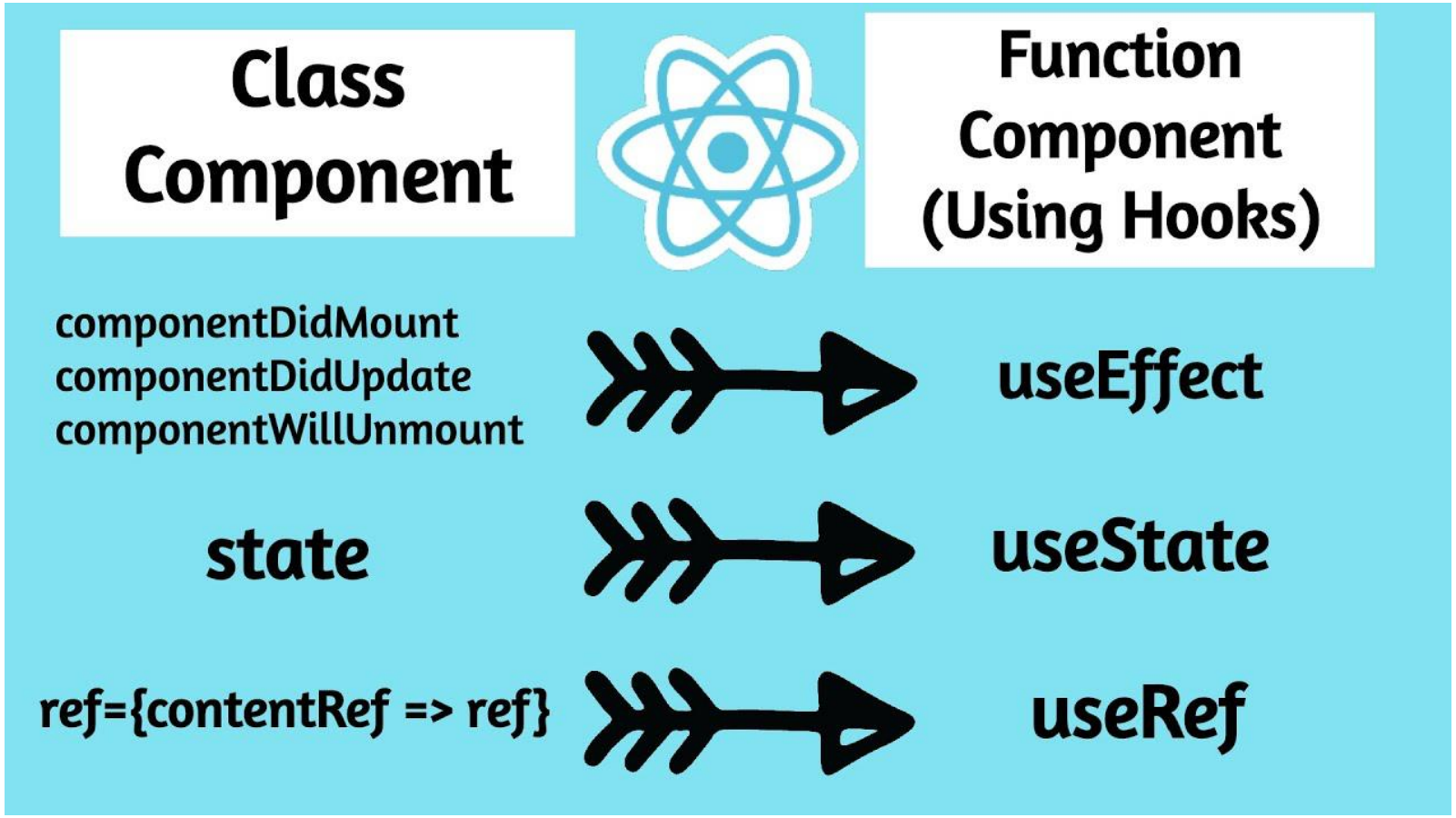


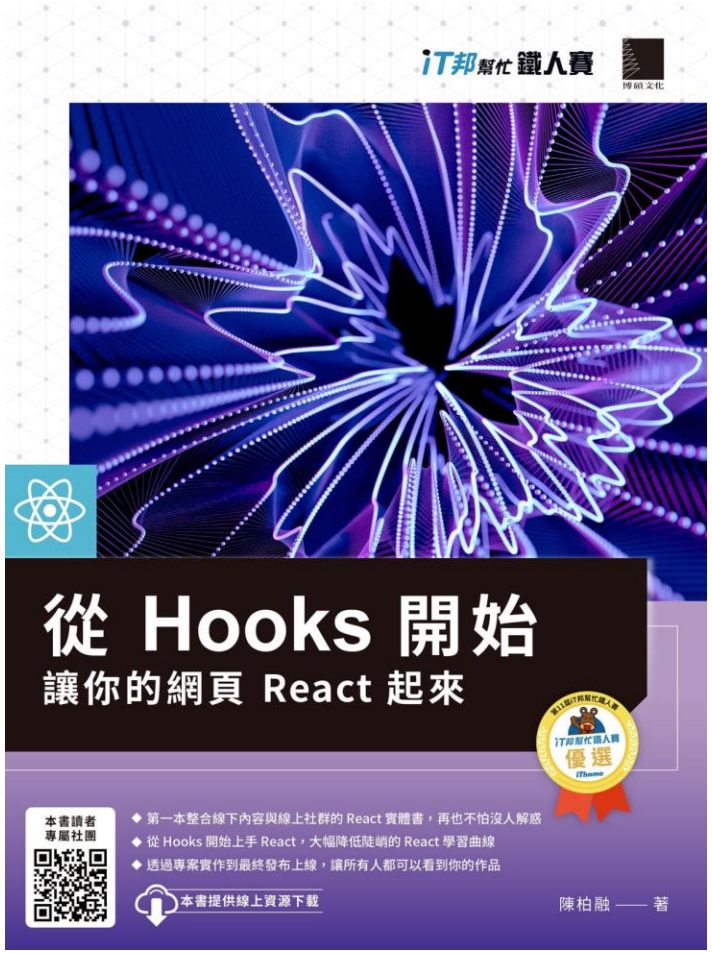


Kramer et al., 2014, PNAS

Class vs. Function Components

Don’t learn/use cumbersome class components

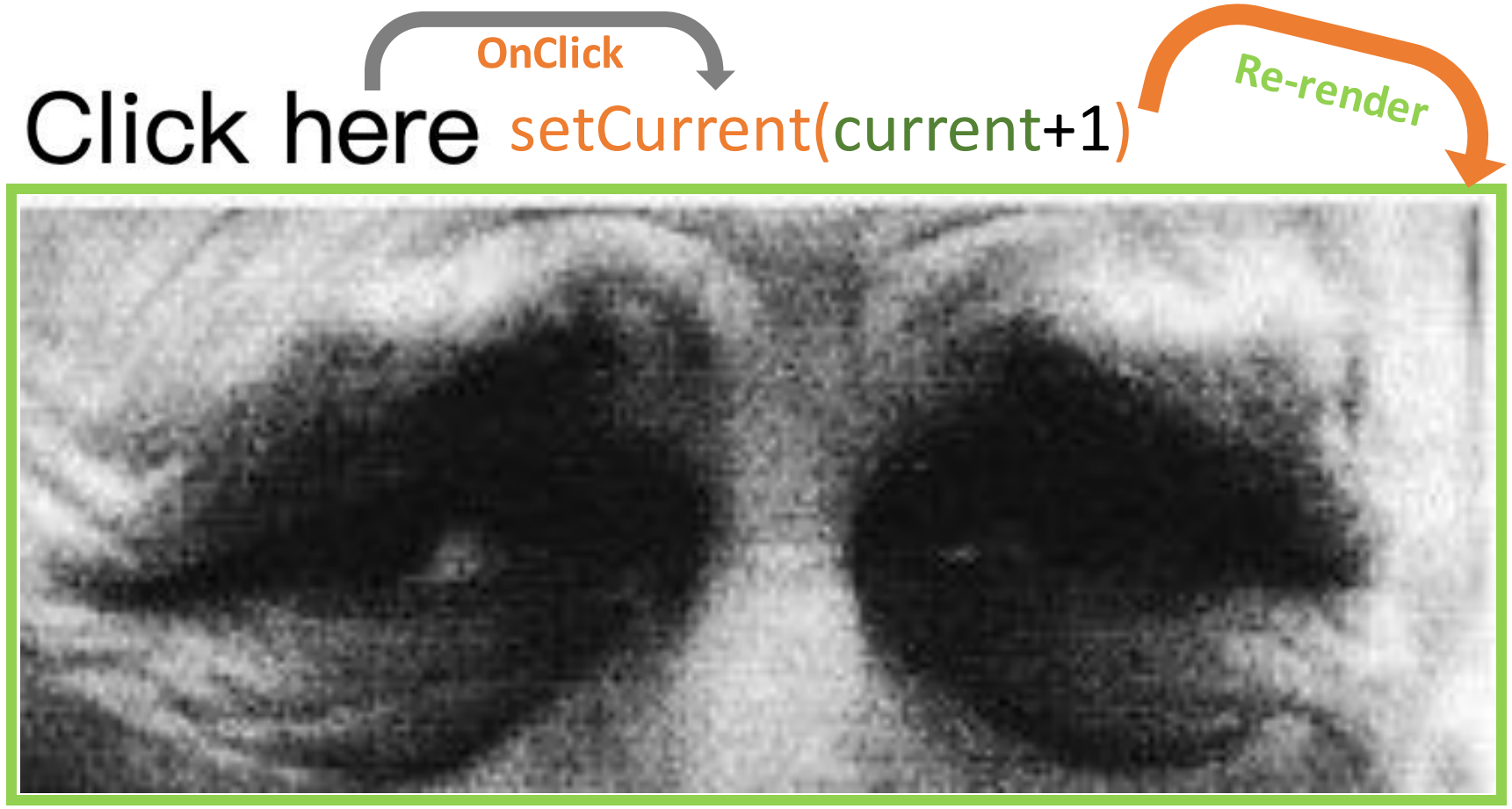




Revisit RMET in React (1/2)

Updating the state var “current” triggers automatic re-rerending

App0



Revisit RMET in React (2/2)

Updating the state var “current” triggers automatic re-rerending

App1

Please indicate the sex of this face:

Page1

○ M ○ F

Next (2/4)

OnClick

setCurrent(current+1)

Re-render

TodoList is a good exercise

TodoMVC

Helping you **select** an MV* framework

Download | View on GitHub | Blog

Introduction

Developers these days are spoiled with choice when it comes to **selecting** an **MV* framework** for structuring and organizing their JavaScript web apps.

Backbone, Ember, AngularJS… the list of new and stable solutions continues to grow, but just how do you decide on which to use in a sea of so many options?

To help solve this problem, we created **TodoMVC** - a project which offers the same Todo application implemented using MV* concepts in most of the popular JavaScript MV* frameworks of today.

Follow | Tweet

Examples

JavaScript	Compile-to-JS	Labs

These are examples written in pure JavaScript.

Backbone.js R	AngularJS R	Ember.js R	KnockoutJS R
Dojo R	Knockback.js R	CanJS R	Polymer R
React R	Mithril R	Vue.js R	Marionette.js R

These are applications written in programming languages that compile to JavaScript.

Kotlin + React R	Spine R	Dart R	GWT R
Closure R	Elm R	AngularDart	TypeScript + Backbone.js
TypeScript + AngularJS	TypeScript + React	Reagent R	Scala.js + React R
Scala.js +	js_of_ocaml R	Humble +	

Game Over