

Rethinking our scrolling and pointing tests

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agenda:

Research

The current state of tools & their pitfalls

Ideation

Ideas we explored

Demo

Try a couple of our tests yourself

agenda:

Research

The current state of tools & their pitfalls

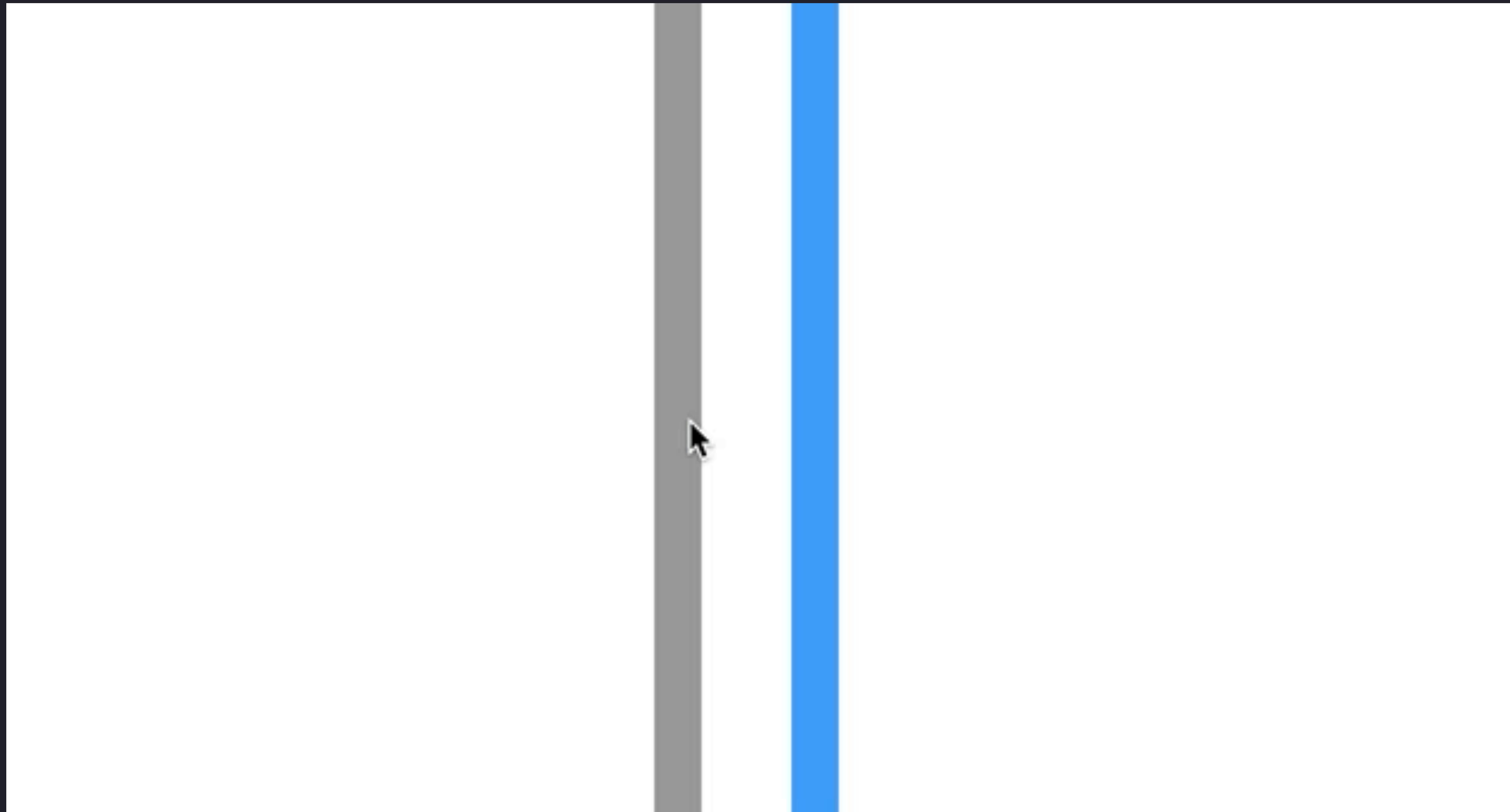
Ideation

Ideas we explored

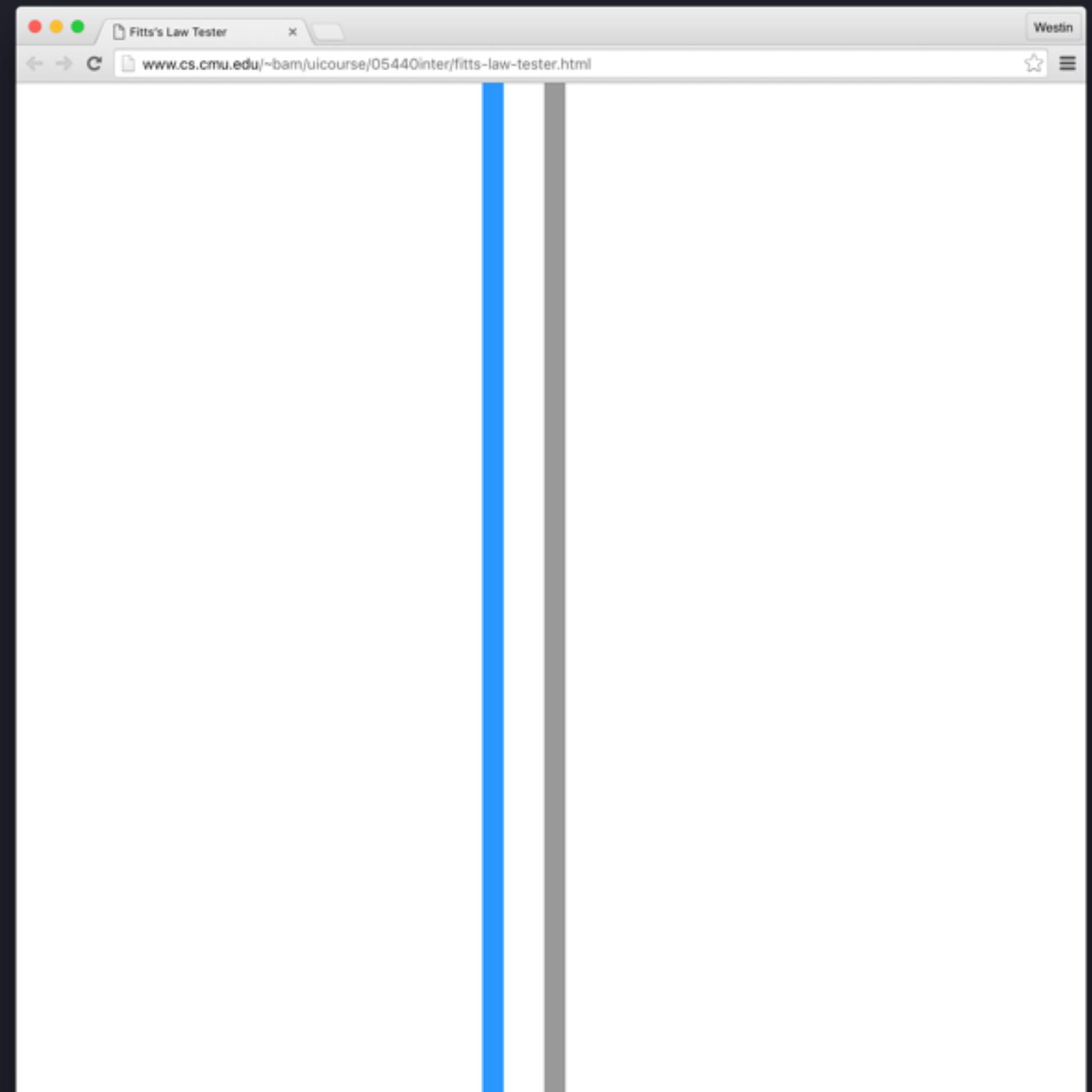
Demo

Try a couple of our tests yourself

the current state of our **Fitts Law Tester**



the current state of **Fitts Law Tester**



- ✖ Only accounts for horizontal movement
- ✖ Requires you to know your screen dimensions in centimeters
- ✖ Uses mis-clicks as a measure of accuracy, rather than measuring the actual distance from the touch target
- ✖ Predictable clicking pattern which does not accurately simulate real-world experiences

the current state of **Fitts Law Tester**

Only accounts for horizontal movement

Could explore both horizontal and vertical movement

Requires you to know your screen dimensions in centimeters

We could auto-detect this

Easy for user to develop a learning curve due to predictable clicking pattern

Lower predictability of intended target

Uses mis-clicks as a measure of accuracy, rather than measuring the actual distance from the touch target
More on this later

the current state of **Scrolling Tests**

The target will not be underlined, so you have to remember to scroll down as fast as you can and click on the left, middle, or right. Scroll down as fast as you can and click on the target.

Click on line 28, "Left"

```
1234567890123456789012345678901234567890123456789012345678901234567890  
    1 Left          Middle          Right  1  
    --  
    --  
    --  
    2 Left          Middle          Right  2  
    --  
    --  
    --  
    3 Left          Middle          Right  3  
    --  
    --  
    --  
    4 Left          Middle          Right  4  
    --
```

members. Academy studies, which include analyses of key technical issues, are selected by the Academy's senior management.

ACB. (1) Access method control block. (2) Adapter control block. (3) Application control block.

ACB address space. In VTAM, the address space in which the ACB is opened. See also associated address space.

ACB-based macroinstruction. In VTAM, a macroinstruction whose parameters are specified by the user.

ACBGEN. Application control block generation.

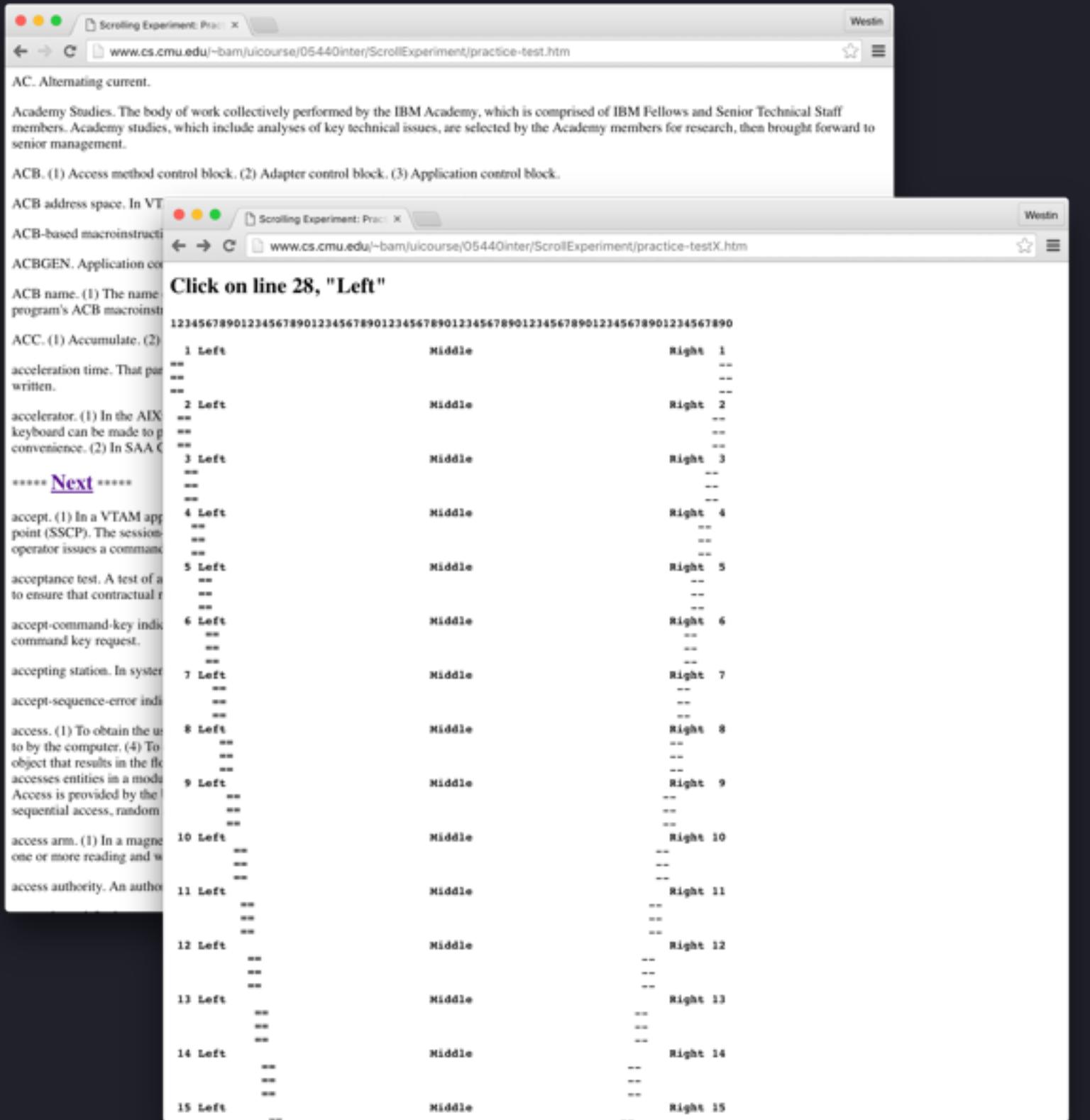
ACB name. (1) The name of an ACB macroinstruction. (2) A name specified either on the VTAM Address Space Name parameter or on the ACB macroinstruction of a program's ACB macroinstruction. Contrast with network name.

ACC. (1) Accumulate. (2) Accumulator. (3) Application control code.

acceleration time. That part of access time required to bring an auxiliary storage device, typically a tape drive, into operation after it has been written.

accelerator. (1) In the AIXwindows program, a keyboard alternative to a mouse button action; for example,

the current state of **Scrolling Tests**



✗ Not an ecologically valid scrolling environment

✗ Not responsive

✗ Doesn't account for overscroll

✗ Requires user to tap on a target

✗ Only measures vertical movement

✗ User must scroll to top to find out where to scroll to

the current state of **Scrolling Tests**

Not an ecologically valid scrolling environment

Potentially could explore different kinds of content

Not responsive

We can fix this

Doesn't account for overscroll

Lets measure when the target enters the viewport

User must scroll to top to find out where to scroll to

A fixed header wouldn't be too hard

Requires user to tap on a target

More on this later...

Only measures vertical movement

More on this later too!

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Ideas we explored

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Try a couple of our tests yourself

Scrolling iteration

Initially, ecological validity and responsiveness stood out to us.

Scrolling Ideation

sit amet, consectetur adipiscing elit. Vivamus magna. Cras in mi at felis aliquet congue. Ut a est eget ligula molestie gravida. Curabitur massa. Donec eleifend, libero at sagittis mollis, tellus est malesuada tellus, at luctus turpis elit sit amet quam. Vivamus pretium ornare est.



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[www.quisqueegestasdiam.com](#)

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[www.nullaposuere.com](#)

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Scroll for image

Scroll for search result

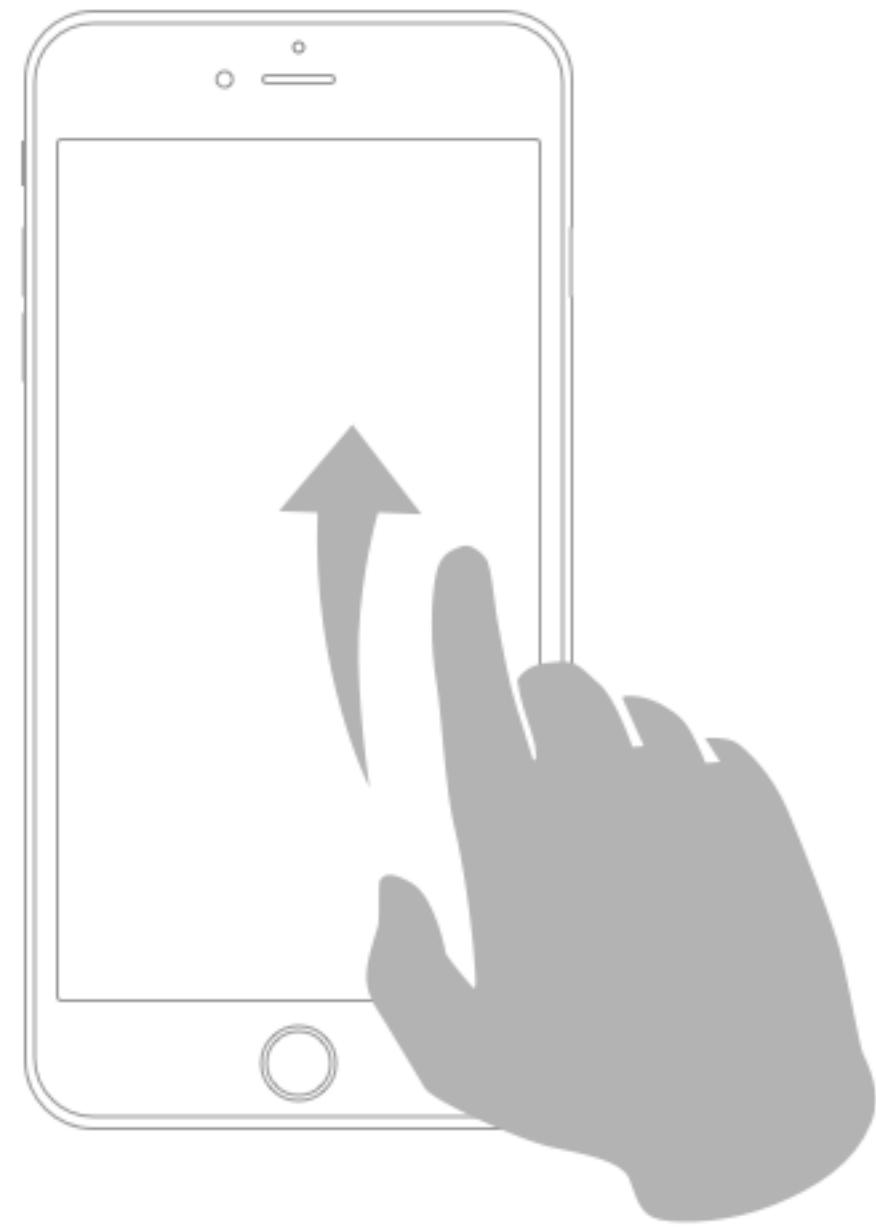
Scrolling Ideation

- ✖ This shouldn't be an "I spy" test
- ✖ What about horizontal scrolling?
- ✖ Still requires user to click

Scrolling Ideation

Requiring the user to click

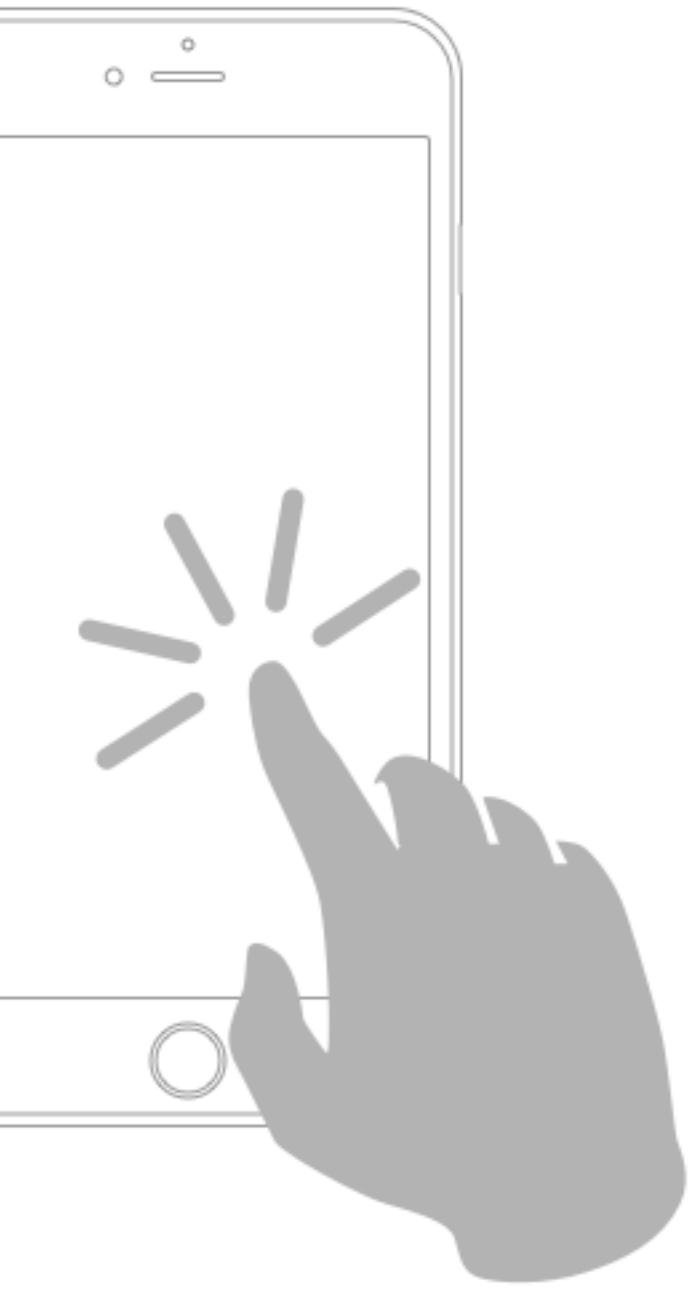
typical scrolling tests



Scroll

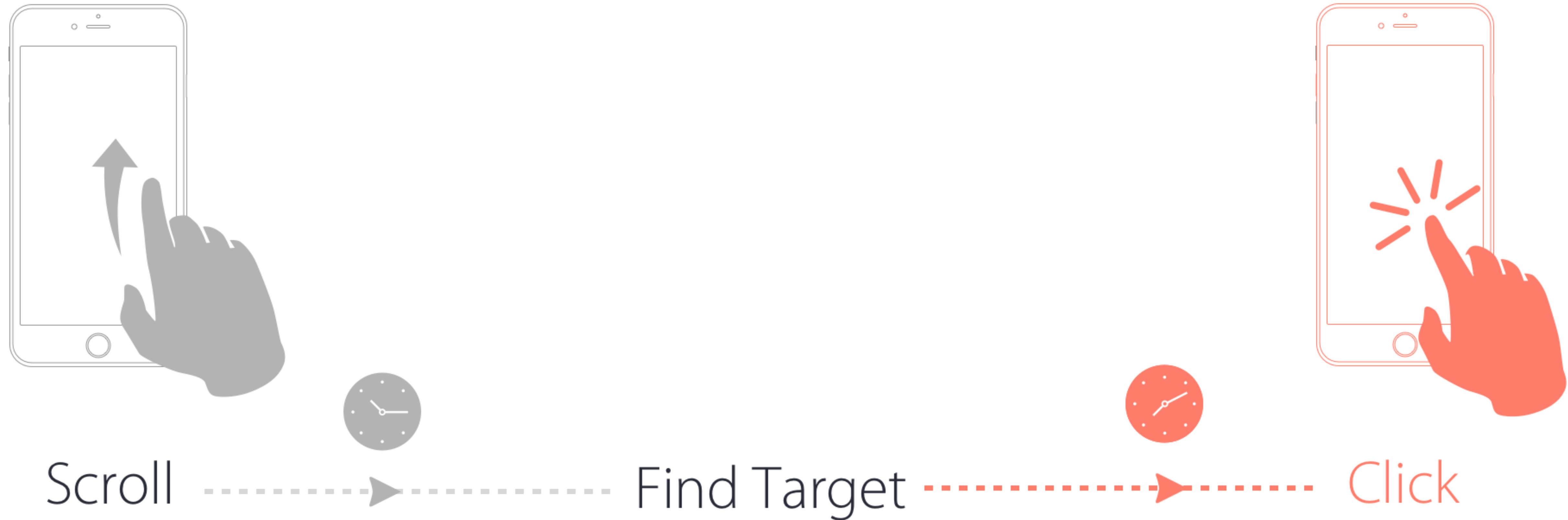


Find Target

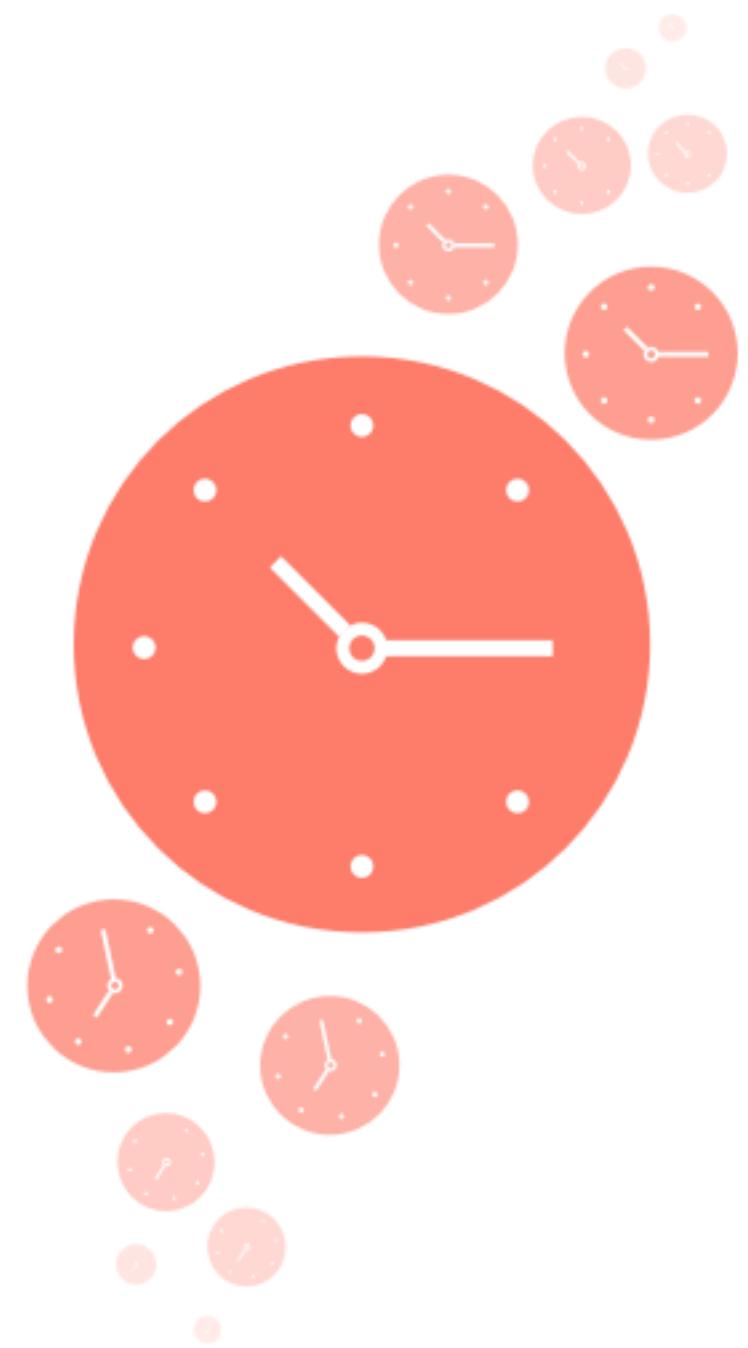


Click

typical scrolling tests



“Time to click” is not what we’re measuring.



How do we avoid this?

We need to standardize the time it takes for a participant to “select” the target

Target area

An area in which the user needs to scroll the target within.

The target must then rest within the target area for one complete second.

The second is then subtracted from the total time-to-select.

nunc non blandit massa enim.

[in ante metus dictum](#)

[www.faucibus.com](#)

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[www.malesuada.com](#)

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[www.egetnulla.com](#)

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fringilla est ullamcorper eget nulla

[www.metus.com](#)

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[www.scelerisquein.com](#)

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“Unknown seek”

In a list of fake search results, find the one with the bright green background.



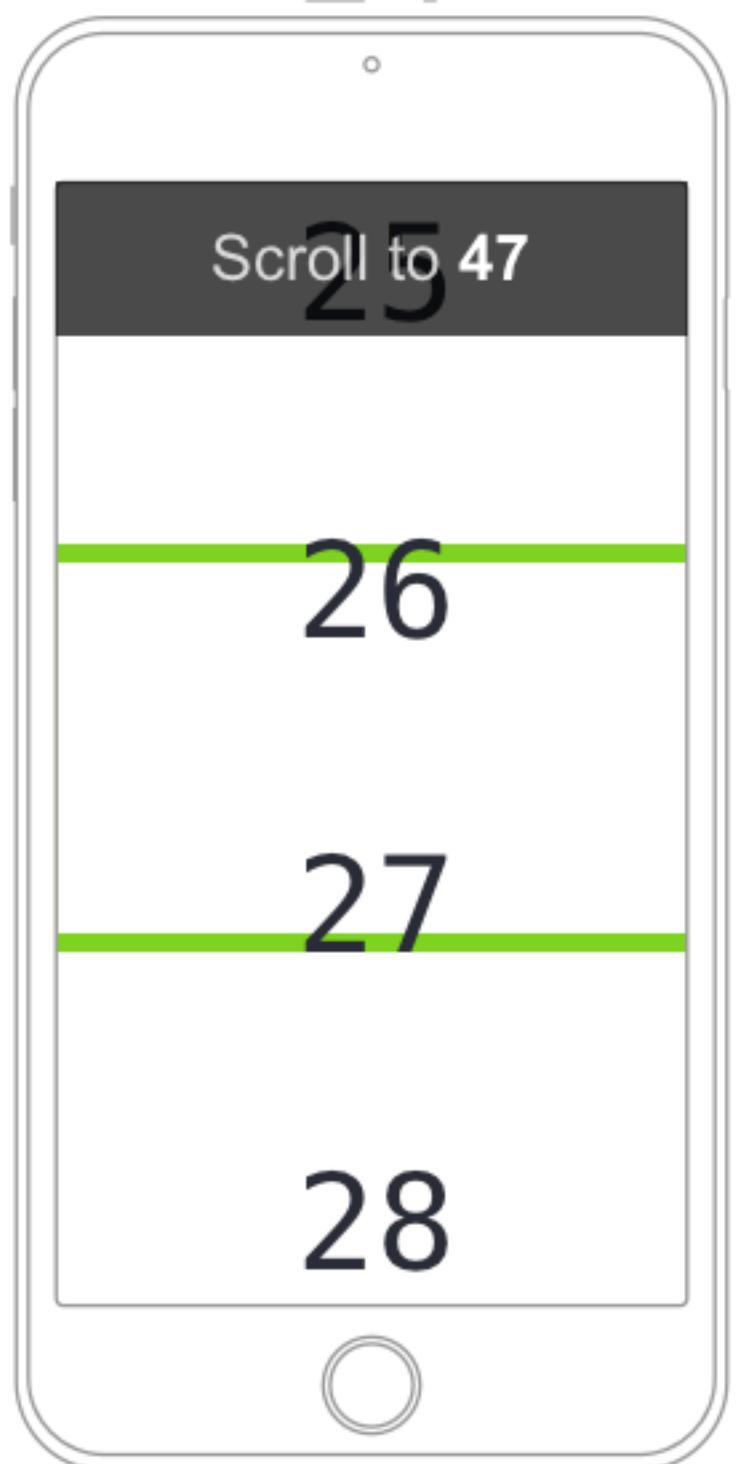
Unknown seek test

- ✓ More realistic scrolling environment
- ✓ Removes “time to click” as a confounding effect
- ✓ Measures “time to select since target has entered the viewport”

22

23

24



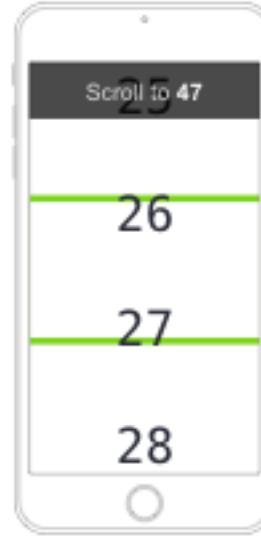
29

30

31

"Known seek"

The user is instructed to scroll to a specific number in a list of numbers.



Known seek test

- ✓ Removes “time to click” as a confounding effect
- ✓ Measures “time to select since target has entered the viewport”
- ✓ Completely responsive

Scrolling Ideation

Only measuring vertical scrolling.

typical scrolling tests



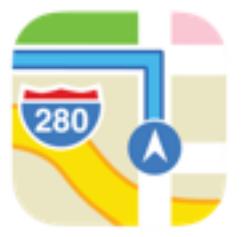
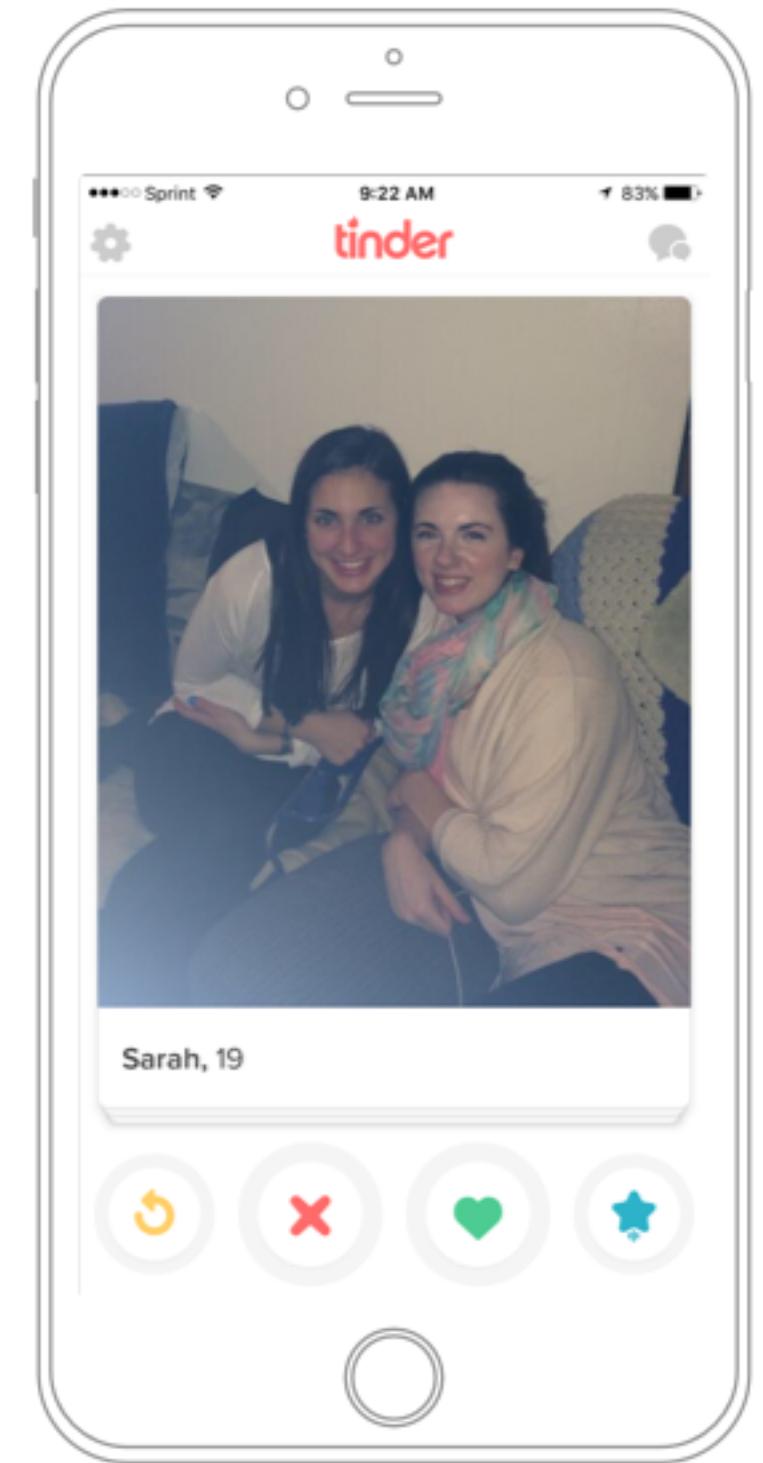
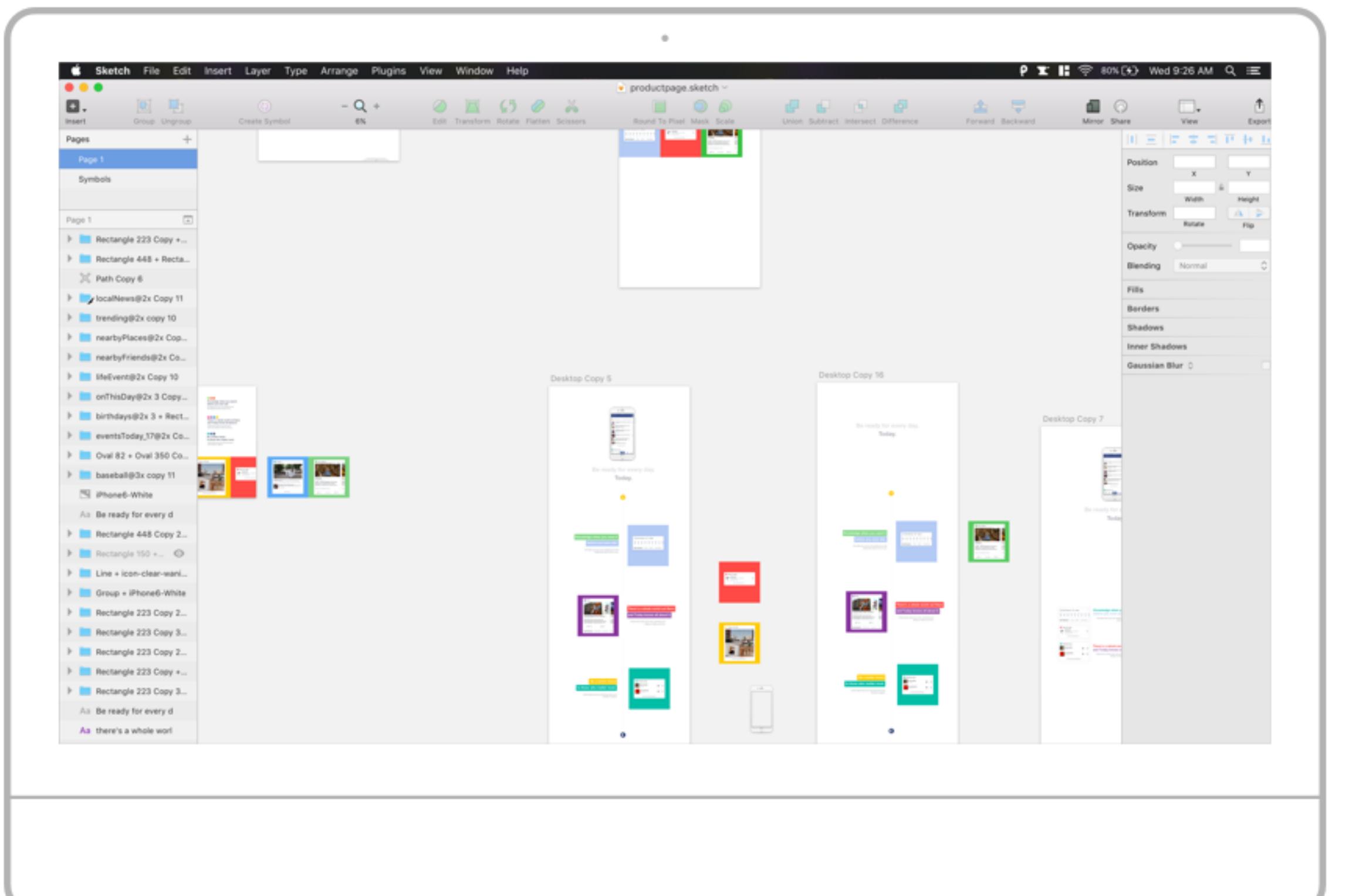
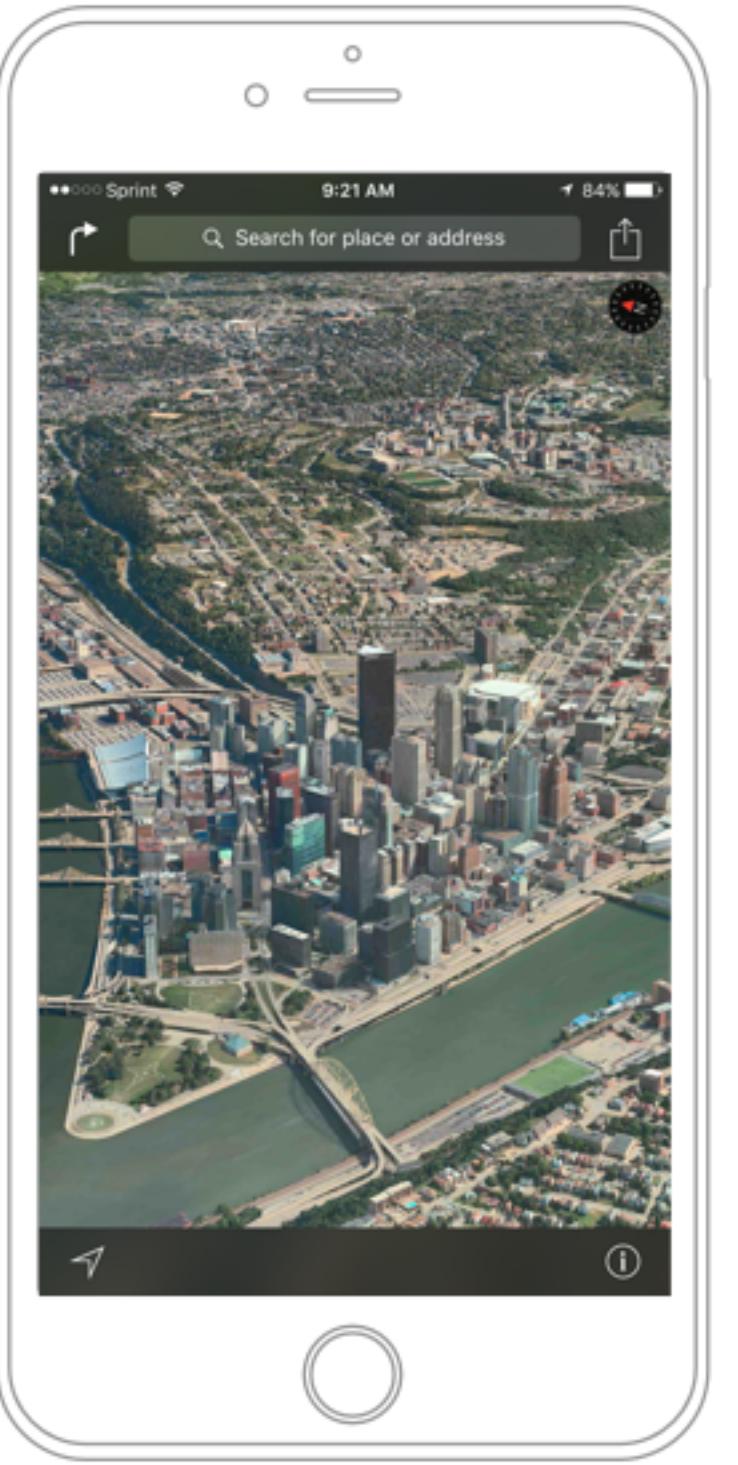
scroll



typical scrolling tests



Sometimes we scroll in different directions.



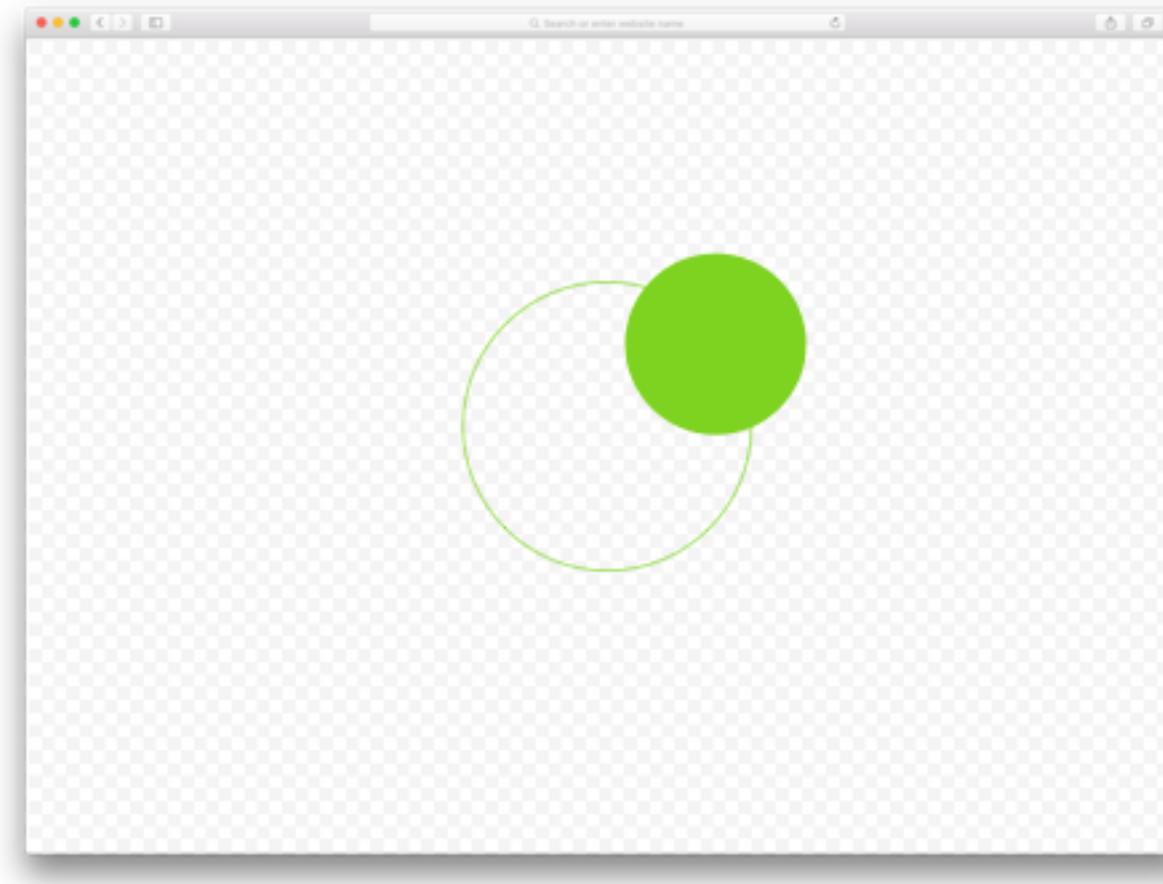
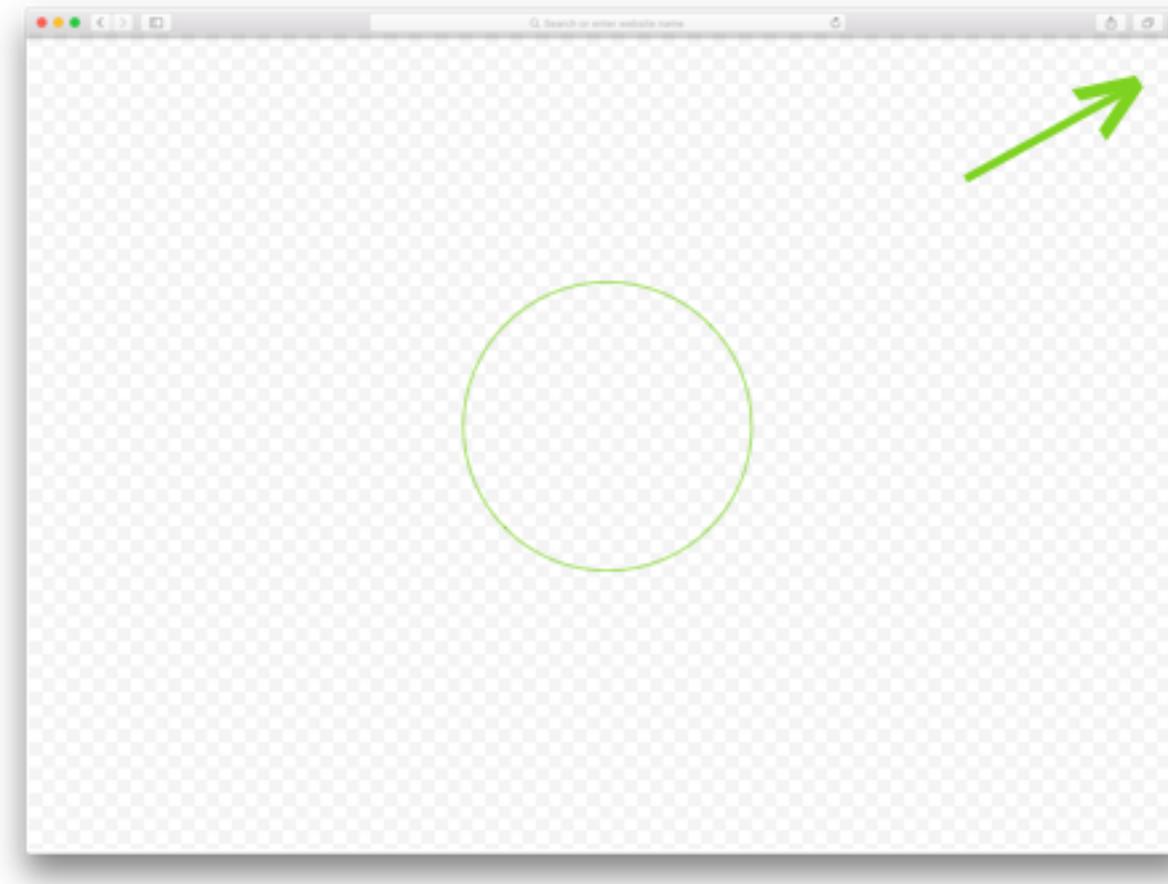
Maps



Sketch



Tinder



Multidirectional: An arrow appears at the edges of the screen, pointing in a direction the user needs to scroll.

The user scrolls in the arrow's direction until they place the target circle within the target area.

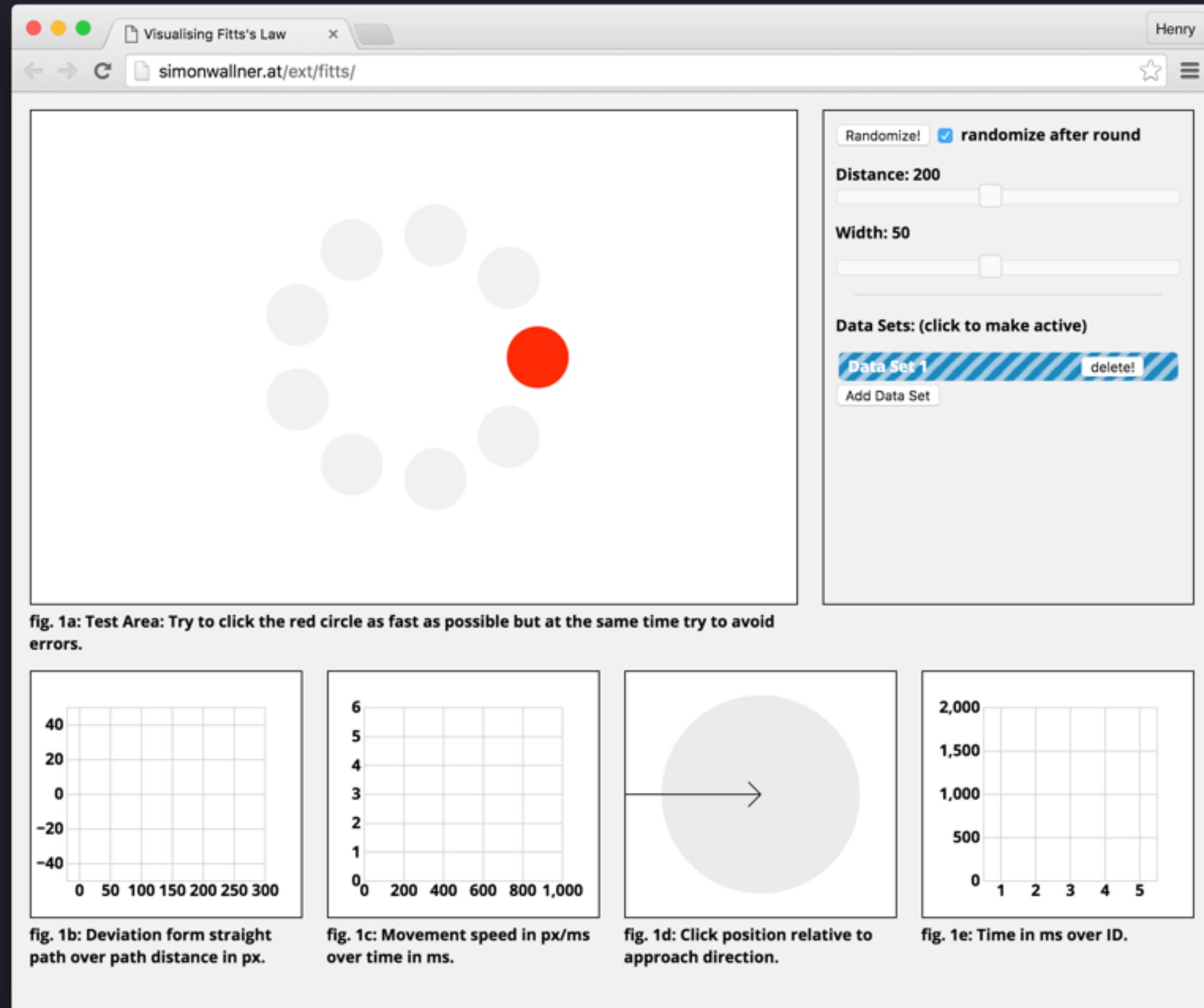


Multidirectional seek test

- ✓ Removes “time to click” as a confounding effect
- ✓ Tests diagonal, horizontal, or vertical movement in each trial
- ✓ One of the first of its kind, as far as I can tell

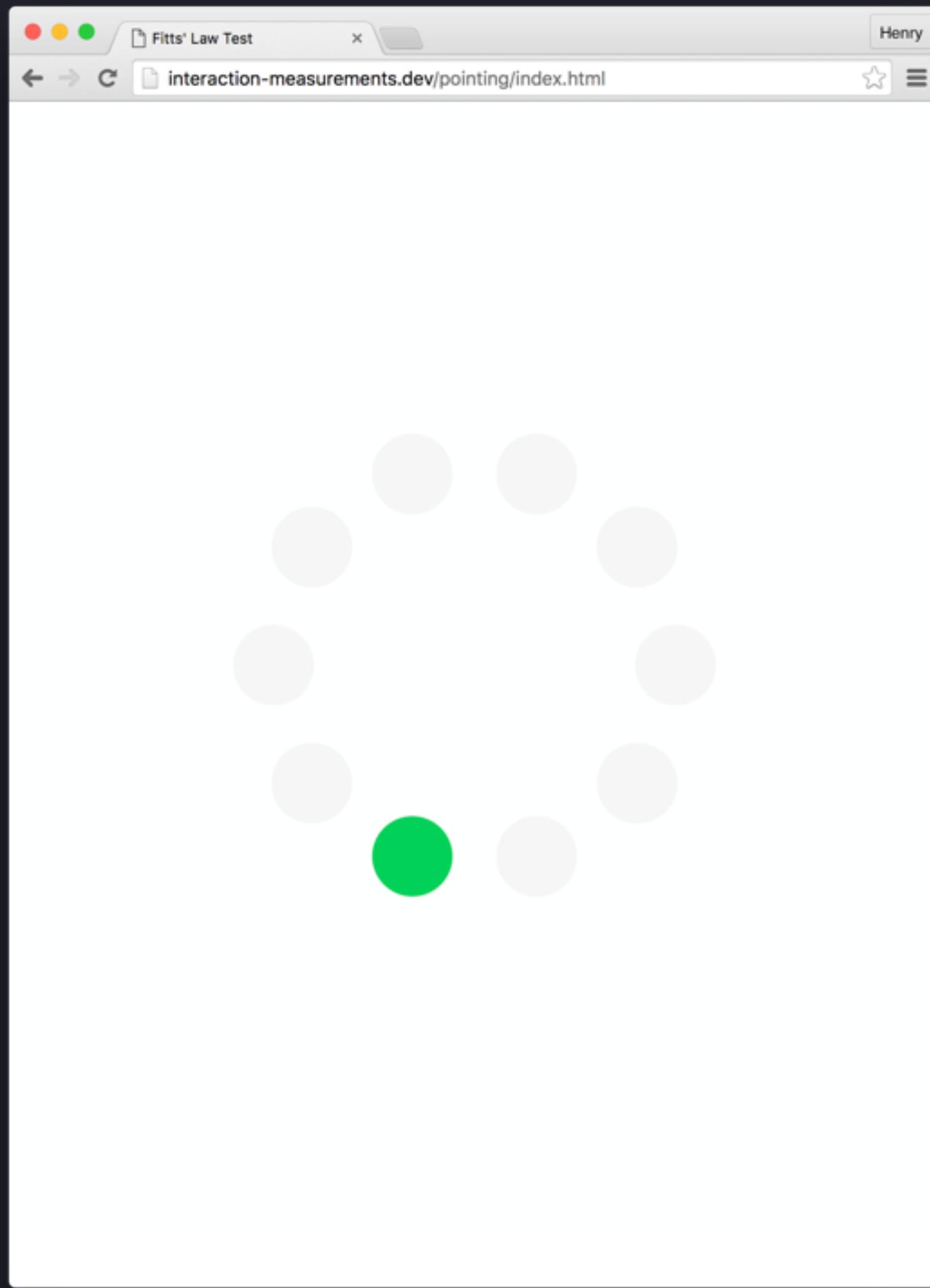
Pointing iteration

the current state of **Fitts Law Tester**



Initially, we took inspiration from tests related to the original Fitts' law test, choosing to implement the touch targets in a way that addressed our concerns.

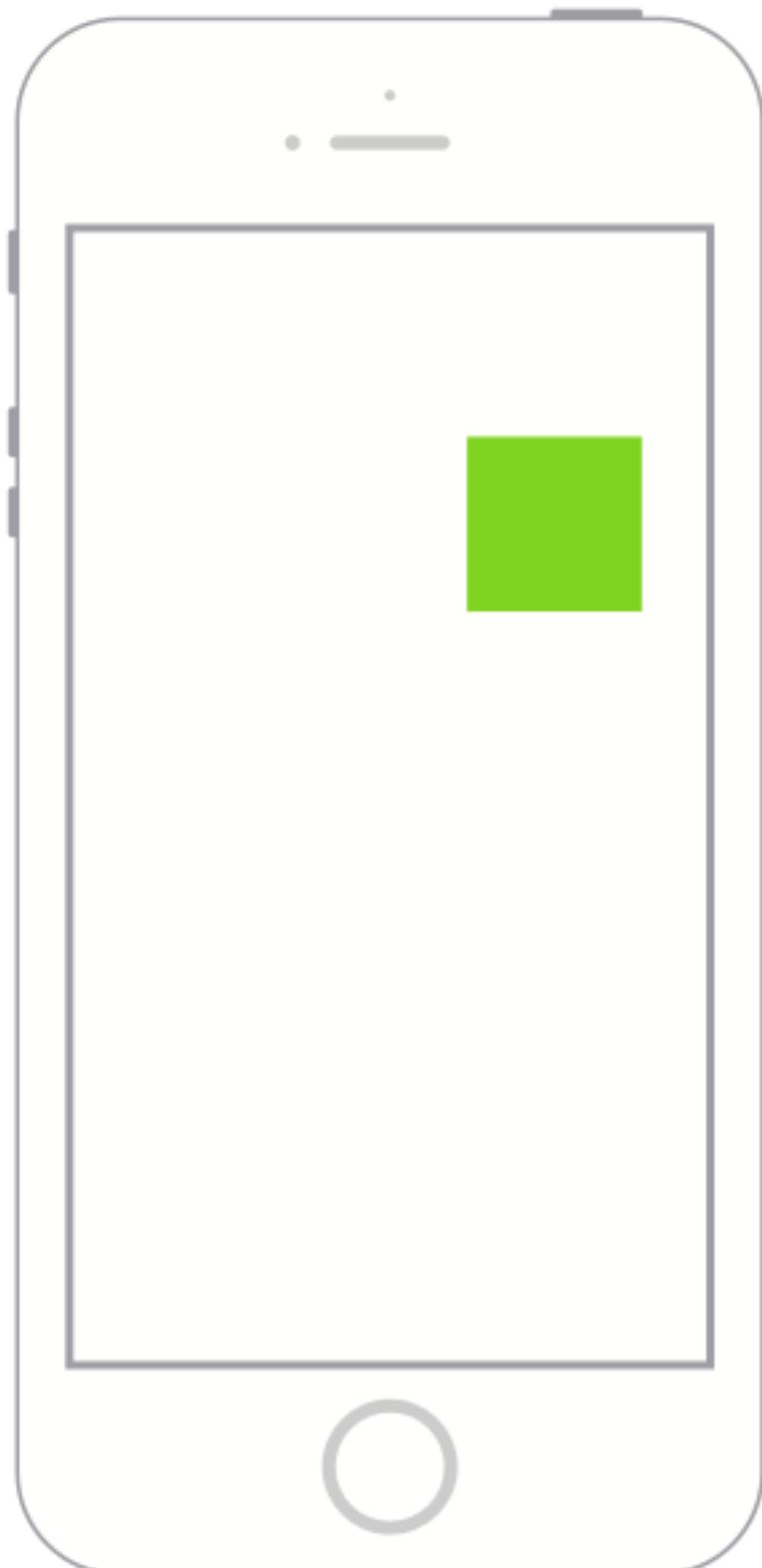
the current state of **Fitts Law Tester**



- ✓ Accounts for horizontal and vertical movement
- ✓ Does not require you to know your screen dimensions
- ✓ Minimizes predictability of task which discourages user learning
- ✓ Increases accuracy by measuring more than just hit or miss
- ✗ Data is non-standard because datapoints are random and distances are sometimes diagonal

Touch Target Test

Movement between touches is always horizontal or vertical only, no diagonal to increase validity of the test and test movement along axes



Targets change size to vary the kind and size of targets

Non-obvious placement -- seems random but isn't

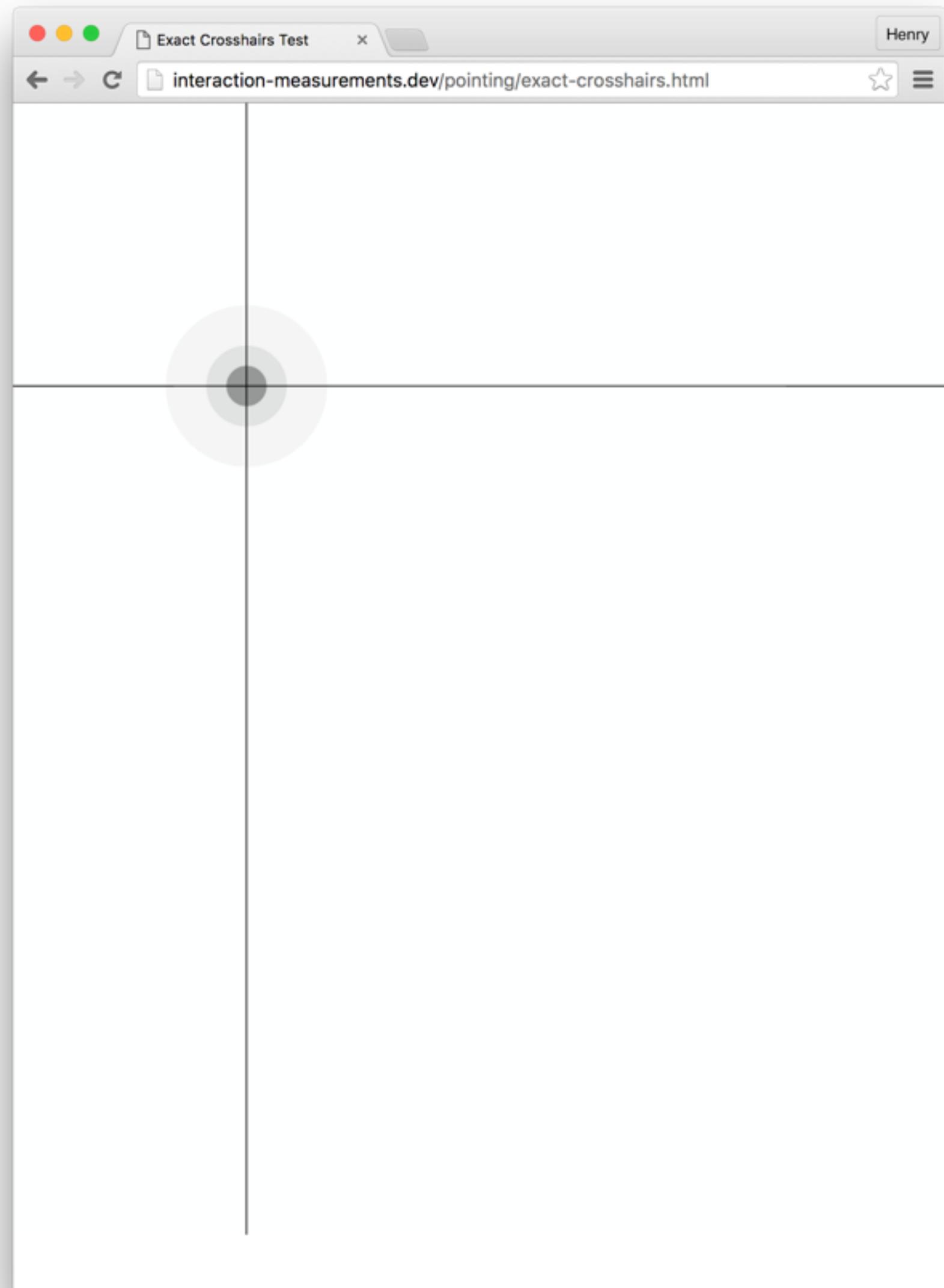
Targets appear at corners of screen as well as targets towards the center to test full space

All current tests use “button-like” touch targets

This blunts the data - categorical hit/miss only

What about precise points?



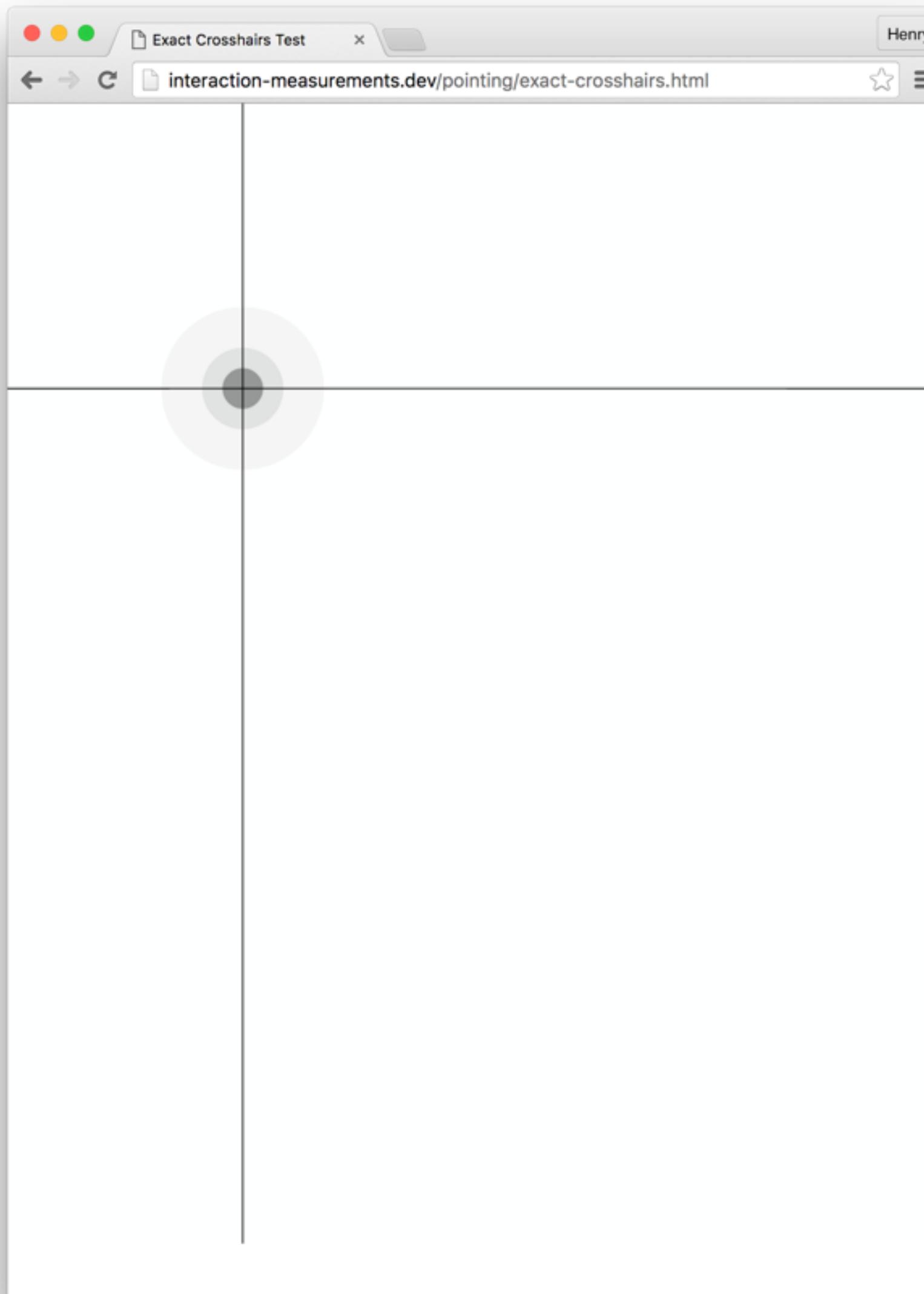


Exact Touch Test

Instead of blunting data with the concept of touch-targets, we can ask users to indicate as close as possible to a single point.

Provides continuous and more precise data

Exact Touch Test



- ✓ Account for multidirectional movement
- ✓ Detects screen dimensions
- ✓ Lower predictability
- ✓ Data is standard because all points are chosen to be straight (non-diagonal) lines
- ✓ Increases accuracy by measuring more than just hit or miss

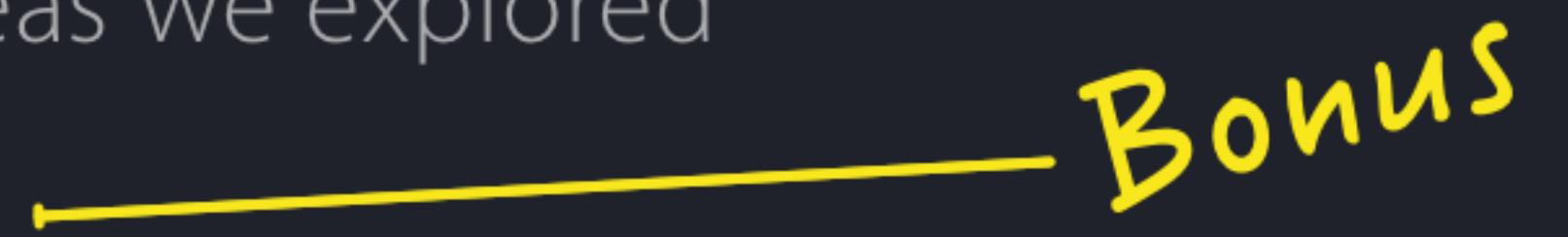
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Ideas we explored



Bonus

Demo

Try a couple of our tests yourself

Improving the UX of administering a test

The starting form and the final results page were a pain to use.

- ✖ Copying and pasting into gDocs
- ✖ Non-standardized way to name devices
- ✖ Plain text hard to decipher data
- ✖ Who knows their screen size in centimeters?

Improving the UX of administering a test

A screenshot of a web browser window showing a 'Scrolling Test' form. The title bar says 'interaction-measure x Scrolling Test 2 x Scrolling Test 1 x New Tab x Scrolling Test x Westin'. The address bar shows 'scrolldemo.dev'. The form is titled 'Scrolling Test' and 'Preliminary Information Form'. It contains fields for 'Your Name' (example: Gerald Montgomery), 'Andrew ID' (example: gmontgo), 'Participant Type' (dropdown menu), 'Input Method' (dropdown menu), 'Model/Brand' (example: Logitech M510), 'Operating System' (Macintosh; Intel Mac OS X 10_11_4), 'Browser' (Chrome), 'Screen Width (pixels)' (1680), and 'Screen Height (pixels)' (1050). A 'BEGIN TEST' button is at the bottom.

- ✓ Ability for pre-defined/common device names/info
- ✓ Auto-detects screen sizes
- ✓ Auto-submits to gDocs
- ✓ Creates graphs for you!

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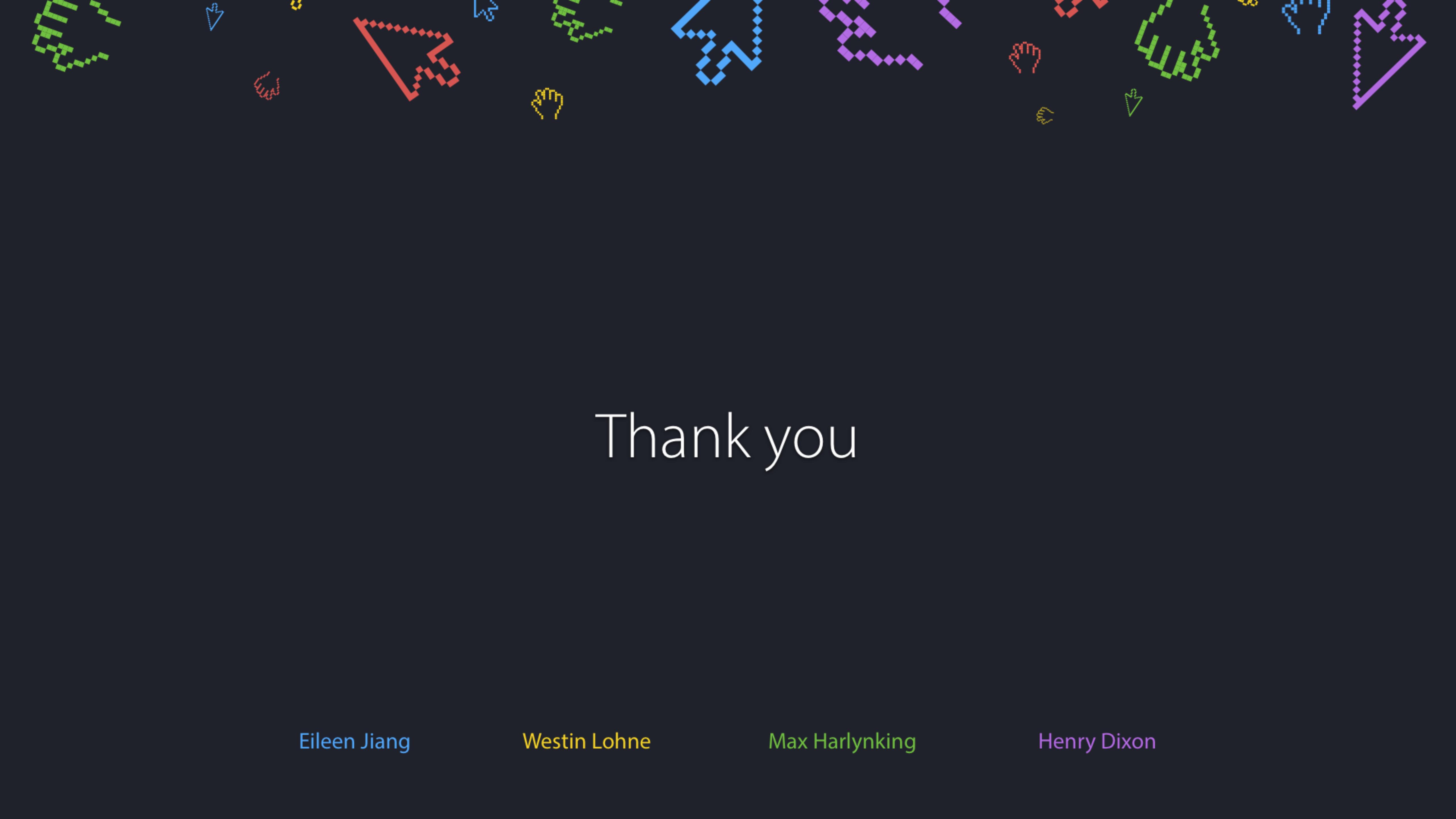
Demo

Try a couple of our tests yourself

bit.ly/bettertests

Check out a preview of two of our tests!

Future work



Thank you

Eileen Jiang

Westin Lohne

Max Harlynking

Henry Dixon

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